

**University of North Texas
Department of Engineering Technology**

1. COURSE NUMBER, NAME:

MFET 4220, CNC Programming and Operation

2. CREDIT AND CONTACT HOURS:

3 hours (2;3), Lecture: Mon 10:30 am - 12:20 pm, Lab: Thu 2:30 pm – 5:20 pm

3. INSTRUCTOR

Dr. Hector R. Siller
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Ph. 940-565-2362

4. TEXTBOOK:

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

5. SPECIFIC COURSE INFORMATION

a) Brief description of the contents of the course:

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

b) Prerequisites:

MFET 4210 or consent of instructor

c) Program:

Elective course in the Bachelor of Science in Engineering Technology program;
Major in Mechanical Engineering Technology

6. SPECIFIC GOALS OF THE COURSE

a) Specific outcomes of instruction:

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

- Enhance established knowledge base of computer-controlled machine tools.
- Enhance programming and troubleshooting skills in CNC Milling Center and CNC Turning Center part programs.

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b) Appropriate Program Outcomes. According to the Engineering Technology Accreditation Commission (ETAC) of ABET, an Engineering Technology program must demonstrate that graduates have:

- (1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, or technology to solve broadly-defined engineering problems;
- (2) an ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline;
- (3) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results;
- (4) an ability to function effectively as a member of a technical team;
- (5) an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.

c) Student learning outcomes: (ETAC of ABET Program Outcomes Addressed)

Upon completion of this course, students should be able to

1. Understand the characteristics of Computerized Numerical Controllers and their Human Machine Interfaces (HMI). (5)
2. Demonstrate competence in writing and reading word address machine tool language, including G and M codes. (1)
3. Explain various machine tool functions in turning and machining centers. (1, 5)
4. Compose manually and verify a CNC milling center part program. (2)
5. Compose manually and verify a CNC turning center part program. (2)
6. Demonstrate practical competence with CAM software in preparing CNC milling and turning center programs. (1, 4)
7. Design and execute process plans for the manufacturing of mechanical parts in CNC machining and turning centers. (2, 4)

7. COURSE OUTLINE:

Week	Lecture	Assignments
1	Introduction, Organization of Course, Course Policies, Process Planning of CNC Machining Operations	HW1 & LAB1
2	Programming of CNC Machining Centers	HW2 & LAB2
3	Programming of CNC Machining Centers	HW3
4	Loading/Editing Programs, Trialing Programs, Optimizing Programs	LAB3
5	Setting Tool Geometry and Work Coordinate Offsets	HW4
6	Programming of CNC Machining Centers	LAB4
7	Prep for Midterm Exam	Project Part. Report 1
8	Midterm Exam	

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9	Review Midterm Results, Programming of CNC Turning Centers	HW4 & LAB5
10	Process Planning of CNC Turning Operations	HW6
11	Programming of CNC Turning Centers	LAB6
12	Setting Tool Geometry and Work Coordinate Offsets	Project work
13	Loading/Editing Programs, Trialing Programs, Optimizing Programs	Project work
14	Fixed Cycles for Turning Centers	Project work
15	Prep for Final Exam	Project work
16	Final exams and Group Project Exhibition	Project Final Report

8. GRADING ELEMENTS AND WEIGHTS:

Lab Group Project	30%
Homework, Lab Practices and Quizzes	30%
Midterm Examination	20%
Final Examination	20%
TOTAL	100%

9. GRADING POLICIES:

Quizzes and examinations are graded based on class performance.

The laboratory activity will be a group effort. Formal evaluations will consist of homework, 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

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ANNEX:

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 (preferably with safety toe), which completely enclose the foot. Sandals and tennis shoes are strictly prohibited.
3. Long, loose hairstyles 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.