MANUFACTURING CENTER OF EXCELLENCE

COURSE SYLLABUS SPRING 2021 (CR# 15469)

COURSE NUMBER: MCHN 2331
COURSE TITLE: Computer Numerical Control Turning Centers
CREDITS: 3
PREREQUISITE / COREQUISITE: Basic Machine Shop I, Basic Lathe, Print Reading, Machine Shop Math

INSTRUCTOR: Roberto Sanchez

INSTRUCTOR CONTACT INFORMATION: 713-718-6888, roberto.sanchez2@hccs.edu

OFFICE LOCATION AND HOURS
My office is located at the Stafford Workforce building on 13622 Stafford Road. Your performance in my class is very important to me. I am available at any time to hear your concerns or just to discuss course topics.
Please send me an email if you want to meet at a particular time.

COURSE DESCRIPTION
Fundamentals of Computer Numerical Control for turning centers.

COURSE OBJECTIVE
Interpret CNC Fanuc® programs for CNC Turning Centers.

BOOKS
HAAS TL1 Manual (PDF File on Canvas)
HAAS SL Lathe Programming Book (PDF File on Canvas)
Precision Machining Technology by Peter J. Hoffman
ISBN-10: 1435447670, ISBN-13: 9781435447677, ©2012 Delmar/Cengage
Optional 1: CNC Machining by Richard A. Gizelbach ISBN 978-1-59070-790-6
Optional 2: CNC by Robert Quesada ISBN 0-13-048867-4
Lab equipment: **Safety Glasses, USB Flash Drive (not larger than 8 GB)**

Note: Most of the lecture material will be provided online through Canvas. **The purchase of the book is optional.**

STUDENT LEARNING OUTCOMES

1. Describe safety practices for CNC equipment.
2. Identify the advantages of a CNC Turning Center over a conventional lathe.
3. Know the differences between vertical, horizontal, and turning machine centers.
4. Perform basic math calculations related to CNC programs for TC's.
5. Gather the necessary CNC Documentation to write a program for a TC.
6. Understanding the programming sequence.
7. Knowledge of the most common G and M codes for turning centers.
8. Knowledge of the S, T, F, H, and D commands.
9. Write simple CNC Fanuc programs.
10. Load, run, debug and test a CNC program in the Machine Simulator.

COURSE POLICIES

Attendance
Students are expected to attend classes regularly, and to be on time for every class period. Students can be dropped from a class due to excessive absences. Excessive tardiness may be considered absences. Students are responsible for subjects, assignments, and projects covered during their absences. Consult the ***Student Handbook*** for more details or visit https://www.hccs.edu/resources-for/current-students/student-handbook/

Students enrolled in a hybrid class are expected to log in the course certain number of hours a week depending of the duration of the semester. Check with your teacher how many hours corresponds to your class.

Academic Honesty
Scholastic dishonesty is treated with the utmost seriousness by the instructor and the College. Academic dishonesty includes, but it is not limited to the willful attempt to misrepresent one's work, cheat, plagiarize, or impede other students' scholastic progress. Consult the ***Student Handbook*** for more details.

Students with Disabilities
Any student with a documented disability who needs to arrange reasonable accommodations must contact the **Disability Support Services Office** at his / her respective college at the beginning of each semester. Faculty is authorized to provide only the accommodations requested by the **Disability Support Services Office.** For Central College, call 713 – 718 – 6164.

Cell Phones
All cell phones must be muted, set to vibrate, or turned off during class.

Calculators
If the course allows the use of a calculator during class, lab projects, and exams, the student is responsible to bring his/her calculator.

Student ID
Students are required to obtain a Student ID. For additional information, consult the ***Student Handbook***.

Parking Rules and Regulations
Students are required to follow HCC's regulations regarding parking and permits. See the **Student Handbook**.

Books, Tools and Supplies
Students are required to purchase and bring to class the required textbooks, tools, notebooks, supplies, and writing instruments as required by the instructor.

Dress Code
Dress code must be appropriate for the class. Students must dress in a way that clothing and accessories do not compromise their safety, and the safety of others. Proper foot wear is required in all laboratories. Absolutely no sandals or other footwear that exposes the feet will be allowed.

Classroom & Laboratory Conduct
Proper behavior is expected in all classes and laboratories. Foul language and horseplay are not allowed. Making or receiving cell phone calls during class are not allowed. Sleeping in class is not allowed.

Course Withdrawal
It is the responsibility of the student to officially withdraw from a course before the official withdrawal deadline. A

student who does not withdraw from a course by the deadline will receive an "F" as the final grade. Also note that under Section 51.907 of the Texas Education Code, an institution of higher education may not allow a student to drop more than six courses.

Complaints

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual's fundamental rights and personal dignity.

Title IX prohibits discrimination on the basis of sex including pregnancy and parental status-in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor.

The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to:

David Cross
Director EEO/Compliance
Office of Institutional Equity & Diversity
3100 Main
(713) 718-8271

Carry Law

"At HCC the safety of our students, staff, and faculty is our first priority. As of August 1, 2017, Houston Community College is subject to the Campus Carry Law (SB11 2015). For more information, visit the HCC Campus Carry web page at https://www.hccs.edu/departments/police/campus-carry/

COURSE TIMELINE, CONTENTS & ACTIVITIES

WEEK # 1: COURSE RULES AND ORIENTATION

- Introduction
- Purpose of the course
- Overview of course syllabus
- Course policies
- Required materials, textbook(s), supplies, and resources (if applicable)
- Disability Support Services
- Registration, schedules, receipts, and student ID
- Importance of updating and maintaining student data (Name, Address, ID #, phone numbers, emails)
- Parking rules and regulations
- Classroom and laboratory safety
- Course withdrawal, **Official Day of Record,** *and last day for withdrawal*
- Course tests, quizzes, exams, and assignments
- Course grading policies
- Instructor information
- Campus orientation

WEEK # 2: Numerical control
- Computer numerical control

- Turning Centers
- Cartesian Coordinate System for Turning Centers
- Absolute and Incremental Systems

WEEK # 3: Math for Turning Centers
- Angles, Polygons, Trigonometry for Turning Centers
- Pythagorean Theorem exercises for TC's
- Lab: Exercises locating Cartesian points on part drawings

WEEK # 4: Turning Centers Operations
- Basic Turning Centers Operations
- Cutting speed and Feed for turning centers
- Lab: Exercises calculating RPM and IPR

WEEK # 5: Programming process
- CNC Documentation
- Programming elements for turning Centers
- Programming sequence for Turning Centers

WEEK # 6: Programming Codes
- G, M codes for turning centers
- Word address parameters: S, F, T, H, D, R, I, K
- Lab: Interpretation of CNC programs for Turning Centers

WEEK # 7: Linear and Circular Interpolation for Turning Centers
- G01, G02, G03
- Lab: Program exercises with interpolations

WEEK # 8: Work Coordinates
- G54
- Lab: Entering the work coordinates in the Control Unit

WEEK # 9: Midterm
- Midterm examination

WEEK # 10: Interpreting CNC Programs
- Interpretation of CNC programs for Turning Centers
- Lab: Writing and running a program with linear and circular interpolation

WEEK # 11: Tool Nose Radius Compensation for Turning Centers
- G40, G41, G42
- Lab: writing and running a program with tool nose radio compensation

WEEK # 12: NIMS Preparation Test
- Practice Test for the CNC Lathe Operator Level I

WEEK # 13: CNC Lathe Fixed Cycle
- G70, G71, G72, G73, G74
- Lab: Writing and running a canned cycle program

WEEK # 14: Writing a CNC program based on a part drawing
- Lab: Writing a program in class and running it in a CNC Turning Center

WEEK # 15: Review
- Course Review for the final

WEEK # 16: FINAL EXAM
- Final Exam

GRADING		LETTER GRADE / NUMERICAL GRADE		
Instructor's discretion (Attendance, attitude, Class participation, etc.):	**10%**	**A**	**90-100**	**Excellent**
		B	**80-89**	**Good**
		C	**70-79**	**Fair**
Quizzes and Homework:	**40%**	**D**	**60-69**	**Passing**
		F	**59-0**	**Failing**
Midterm:	**25%**			
Final Exam:	**25%**			
	100%			