

COASTAL BEND COLLEGE
INDUSTRIAL TECHNOLOGY
CNC PROGRAMMING SYLLABUS

MCHN 2344:	CNC Programming
Course Term:	Summer I, 2012
Semester Hours:	3
Location:	Alice Campus, Room 165 and Machine Lab
Prerequisite:	MCHN 2335 Advanced CNC Machining
Instructor:	Rick Pearce Phone: (361) 664-2981 ext. 3053 Email: pearcer@coastalbend.edu
Textbook:	<u>CNC MACHINING - Fundamentals and Practices</u> , Richard A. Gizelbach ISBN 9781590707906 (Required) <u>MACHINING FUNDAMENTALS</u> , John R. Walker, ISBN 9781590702499 (Optional, but recommended) <u>MACHINING FUNDAMENTALS WORKBOOK</u> , John R. Walker, ISBN 9781590702505 (Optional, but recommended)
Supplies:	Safety glasses, hearing protection, tooling and material for lab projects will be provided, subject to policies outlined in class.
Course Description:	CNC Programming is a continuation of the second semester of Advanced CNC Machining. Students will learn additional new concepts and will continue to utilize their algebra and trigonometry skills to calculate coordinates for CNC projects. Instruction on machine terminology, theory, part layout and bench work is included. Emphasis will be placed on shop safety, housekeeping and preventative maintenance.
Course Learning Outcomes:	Students will be able to create more complex CNC programs that include all necessary codes to safely and efficiently produce multiple parts accurately. Canned cycles, Loops and Sub-Programs will be introduced. Emphasis will be placed on good

housekeeping, proper safety procedures and preventative maintenance.

Supplementary Materials:

Audio visual aids (DVD, video tape, Power Point presentations, etc.), handout materials

Performance Objectives:

Following oral and written instructions, and using industry accepted safe practices, the student will be able to perform the following tasks in the classroom and machine lab. The knowledge achieved will be evidenced by satisfactorily performing laboratory demonstrations, completion of assignment sheets, and by scoring the college minimum satisfactory grade.

1. Safety

- A. Student will be expected to identify and use properly all Personal Protective Equipment (PPE) required by OSHA or other governing entities and routinely used in commercial machine shops.
 - B. Students will be able to identify and take corrective action when they observe an unsafe condition or practice.
 - C. Students will maintain a clean and safe work environment at all times, and will follow accepted safety procedures at all times.
2. Print reading and machine shop mathematics.
- A. Students will be able to identify various drawing elements and describe the purpose for each element.
 - B. Students will be able to interpret a 2 dimensional drawing and visualize and / or create a finished machined part from the drawing by utilizing standard process planning methods.
 - C. Students will be able to use dimensional information given on a print and convert between inch and metric or between fractional and decimal.
 - D. Students will be able to use dimensional information given on a print and be able to calculate additional information necessary to complete the finished part to print specifications. Example: Determine X and Y coordinates when given a statement such as “5 holes equally spaced on a 3 inch bolt circle”.
 - E. Students will be able to write code for a CNC program and include all necessary criteria to successfully produce a finished part that meets all requirements of the blueprint or written work order.
3. Analyze the Bill of Materials (BOM) on a drawing or create one if necessary and procure the appropriate items.
4. Identify different materials used in manufacturing.
- A. Students will be able to evaluate specific properties of materials to determine if is ferrous or non-ferrous, or metal or non-metal and use the information to determine proper feeds and speeds.
 - B. Students will be able to identify and select the appropriate material for specific applications based on information provided on the print.

5. Identify and use appropriate measuring tools in the correct manner, based on size and material of the part and tolerance to be held.
6. Identify the major parts of each machine tool and correctly use proper CNC codes to control the actions of each corresponding part.
7. Operate different machine tools safely and accurately.
8. Use hand tools safely and effectively.
9. Use correct procedure to layout rough material on the bench to prepare for machining.

Teaching Methods:

1. Lecture on textbook.
2. Lecture on “Coastal Bend College” safety handbook.
3. Power Point presentations and videos.
4. Handout materials.
5. Overhead transparencies.
6. Individual and group discussions in the lab.
7. Team corroboration on lab projects.
8. Hands on training on CNC machines in the lab.

Evaluation Methods:

1. Attendance.	10%
2. Lab tests and lab performance. (Projects)	30%
3. Safety.	10%
4. Participation in classroom activities and homework.	25%
5. Written exams, quizzes.	25%

Attendance Policy:

Students must attempt to attend all classes. Excessive absenteeism will have a detrimental effect on the student’s grade. Emergencies happen, please contact the instructor as soon as possible when you must miss a class. The same criteria an employer uses to evaluate absences will be used here, including dismissal from the class. We keep track of how many times your grandmother has died.

Classroom and Lab Conduct:

Safety. Horseplay and other inappropriate behavior will not be tolerated. Deliberate unsafe acts such as horseplay, fighting, practical jokes and any other non professional behavior may result in **immediate dismissal** from the class and a failing grade will result.

Appropriate Dress. Students will be expected to arrive ready to work in an industrial environment. Students must wear closed shoes, long trousers and short sleeves when working in the shop. Necklaces, loose bracelets watches or any other body decoration that may get caught in rotating machinery must be removed. Any student wearing shorts, open shoes or flip flops, or any other clothing deemed unsafe will not be allowed in the machine lab and they will be marked absent for the period.

Tobacco. The use of any form of tobacco, including smoking or smokeless will not be allowed in either the classroom or the shop, or within 20 feet of any entrance to the building.

Cell phones, PDA or any other device that distracts student attention must be set to vibrate or turned off. If you truly have an emergency, please excuse yourself from the classroom, or, if you are in the lab, stop your machine safely and move to an area of the room, or preferably to the hallway or outside the building so you do not distract other students. Use of cell phones at a machine or any other unsafe action will not be tolerated.

Refreshments. Refreshments can be brought into the lab area as long as the containers are disposed of by the end of class. Partially filled containers left in the lab will result in a ban of all refreshments.

Integrity. This word is used to describe the vast majority of people. It will never be used to define someone that does not respect the rights, feelings and property of others. Make sure that all of the assignments and tests that you complete are from your own labors.

Syllabus Statement on Disabilities

(September 2009)

Students with special needs, including physical and learning disabilities, who wish to request accommodations in this class, should contact the Counseling Office as soon as possible to make arrangements. In accordance with federal law, a student requesting accommodations must provide documentation of disability to the Special Needs Counselor. For more information, please go by the Counseling Office, or contact:

Beeville Counselor, Eddie Rojas, edrojas@coastalbend.edu (361) 354-2731 or 2304

Alice Counselor, Dee Berthold, deedee@coastalbend.edu (361) 664-2981 Ext.3025

Kingsville Counselor, Pete Trevino, ptrevino@coastalbend.edu (361) 591-1615 Ext.4077

Pleasanton Counselor, Lauren Denver, ldenver@coastalbend.edu (830) 569-4222 Ext. 1203

Course Outline:

- I. Introduction to Safety in the Machine Trades
- II. Tour of Machine Shop
- III. Basic Measuring Tools
- IV. Basic Machine Shop Mathematics
- V. Basic Machine Shop Print Reading
- VI. Tool Sharpening
- VII. Lathe Safety and Operation
- VIII. Milling Machine Safety and Operation
- IX. Drilling Machine Safety and Operation
- X. Band Saw Safety and Operation
- XI. Job Planning
- XII. Part Layout
- XIII. Additional Assignments at the Instructors Discretion

COASTAL BEND COLLEGE

INDUSTRIAL TECHNOLOGY

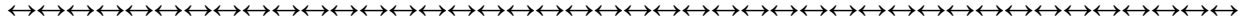
CNC PROGRAMMING COMPETENCY PROFILE

STUDENT: _____

COURSE: MCHN 2344

INSTRUCTOR: Rick Pearce

SEMESTER / YEAR: SUMMER I / 2012



RATING SCALE:

- 4 Skilled: Can work independently with no supervision.**
- 3 Moderately Skilled: Can perform assignment completely with limited supervision.**
- 2 Marginally Skilled: Requires frequent instruction and close supervision.**
- 1 No Exposure: No experience or knowledge in this area.**

4	3	2	1	COMPETENCY
				Wears appropriate PPE at all times
				Demonstrates a desire to always work in a safe manner without prompting
				Follows established safety procedures
				Using the Cartesian Coordinate System, convert the information given on an engineering drawing to appropriate X, Y or Z references
				Uses engineering drawing and appropriate layout tools to prepare a rough part for machining
				Determines appropriate tooling needed and calculates the correct feeds and speeds for each
				Writes appropriate machine code to efficiently and safely produce a completed part that meets all criteria specified by the engineering print
				Able to construct multiple lines of machine code using loops and / or sub programs that will drill multiple holes to a specified depth and location, and contains the following steps: rapidly approach a predetermined location, drill to a specified depth, and rapidly exit the hole to a predetermined height
				Given the cutter specifications, able to calculate the necessary information needed to construct machine code that will automatically machine multiple slots using loops and / or sub programs
				Prepares finished part for inspection and uses the appropriate measuring device to compare the finished part to engineering drawing
				Demonstrates safe practice by periodically cleaning the work area and thoroughly cleans the work area and machine at the end of the class period.