MCHN 1343: Machine Shop Mathematics

Course Term: Fall, 2012

Semester Hours: 3

Location: Alice Campus, Room 165

Prerequisite: High school algebra, (Trigonometry preferred)

Instructor: Rick Pearce
Phone: (361) 664-2981 ext. 3053
Email: pearcer@coastalbend.edu

Textbook:
- **APPLIED MATHEMATICS**, R. Jesse Phagan,
  ISBN 9781605252780 (Required)

- **APPLIED MATHEMATICS WORKBOOK**, R. Jesse Phagan,
  ISBN 9781605252797 (Required)

- **PRINT READING FOR INDUSTRY**, Walter C. Brown and Ryan K. Brown
  ISBN 9781605253084 (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:
Machine Shop Mathematics is an introductory course that will assist the student in understanding the need for mathematics in the machining industry. Given basic information on blue prints and written documents commonly found in machine shop environments, students will be able to calculate additional information needed to manufacture the product described. Extensive use of trigonometry, geometry, conversion between decimal and fractions, and between SAE (inch) and metric (SI) will be utilized. In addition, 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 use different mathematical concepts and understand the relationships between mathematics and the manufacturing industry.
**Supplementary Materials:** Audio visual aids (DVD, video tape, Power Point presentations, etc.)
Handout materials

**Performance Objectives:** Following oral and written instructions the student will be able to perform the following tasks in the classroom. The knowledge achieved will be evidenced by satisfactorily completing assignments and tests, and scoring the college minimum satisfactory grade.

1. 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 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”.

2. Analyze the Bill of Materials (BOM) on a drawing or create one if necessary and procure the appropriate items, allowing for rough stock removal if necessary.

3. 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.
5. Overhead transparencies.
6. Individual and group discussions in the lab.
7. Team corroboration on lab projects.

**Evaluation Methods:**

1. Attendance. 10%
2. Participation in classroom activities and homework. 50%
3. Written exams, quizzes. 40%

**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.

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.

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. Job Planning
VII. Part Layout
VIII. Additional Assignments at the Instructors Discretion
COASTAL BEND COLLEGE
INDUSTRIAL TECHNOLOGY
MACHINE SHOP MATHEMATICS COMPETENCY PROFILE

STUDENT: ______________________  COURSE: MCHN 1343
INSTRUCTOR: __Rick Pearce____________  SEMESTER / YEAR: FALL / 2012

RATING SCALE:

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<tr>
<td>4</td>
<td>Skilled: Can work independently with no supervision.</td>
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<td>3</td>
<td>Moderately Skilled: Can perform assignment completely with limited supervision.</td>
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<td>Marginally Skilled: Requires frequent instruction and close supervision.</td>
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<td>No Exposure: No experience or knowledge in this area.</td>
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COMPETENCY

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<tr>
<td>4</td>
<td>Student wears appropriate PPE at all times</td>
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<td>Student demonstrates a desire to always work in a safe manner without prompting</td>
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<td>Student follows established safety procedures</td>
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<td>Student determines correct feeds and speeds for the material and tools given</td>
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<td>4</td>
<td>Student uses engineering drawing and appropriate layout tools to prepare a rough part for machining</td>
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<td>3</td>
<td>Student demonstrates ability to convert between SAE and SI</td>
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<tr>
<td>2</td>
<td>Student demonstrates ability to convert between decimal and fraction</td>
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<td>1</td>
<td>Students will become familiar with trigonometry and will understand the relationship between angles and sides of triangles, trig tables and how they are used and the importance of trigonometry as it is used in the manufacturing industry</td>
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<td>Student will be able to perform all mathematical functions using the inch system, both decimal and fractional, and the metric system</td>
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<td>Student is able to use basic information provided to calculate additional complex information needed to ensure the finished part is within tolerance</td>
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