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Course Outline for MATH 53B

TECHNICAL INTERMEDIATE ALGEBRA FOR WELDING B

Effective: Fall 2018

I. CATALOG DESCRIPTION:
MATH 53B — TECHNICAL INTERMEDIATE ALGEBRA FOR WELDING B — 1.00 units

This course provides a survey of algebraic processes with an emphasis on applications in welding. Topics covered include, but are not limited to: quadratic equations, functions, and mathematical models. This course may not be used as a prerequisite for any transfer level course.

1.00 Units Lecture

Prerequisite
MATH 72D - Technical Elementary Algebra D
with a minimum grade of C
and

MATH 53A - Technical Intermediate Algebra for Welding A
with a minimum grade of C

Grading Methods:
Letter or P/NP

Discipline:
- Mathematics

	MIN
Lecture Hours:	18.00
Expected Outside of Class Hours:	36.00
Total Hours:	54.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. MATH72D
1. Apply concepts of slopes and rates of change
2. Write equations of lines
3. Develop and describe basic linear models
4. Solve systems of linear equations in two variables by graphing
5. Solve systems of linear equations in two variables by either the elimination or the substitution methods
6. Solve applied problems using a variety of techniques including proportions, percentages, linear equations or systems of linear equations

B. MATH53A
1. Evaluate and simplify formulas and algebraic expressions;
2. Perform operations with algebraic expressions;
3. Simplify expressions with exponents;
4. Solve literal equations;
5. Apply principles of plane geometry to solve problems involving angles, areas, and perimeter;
6. Apply principles of solid geometry to solve problems involving surface area, lateral surface area and volume;
7. Perform calculations involving trigonometric ratios and radian/degree conversions;
8. Solve triangle problems using right-triangle trigonometry, the Law of Sines or the Law of Cosines.

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

A. Solve quadratic equations;
B. Use function notation appropriately;
C. Determine the domain and range of a function;
D. Solve applied problems utilizing linear, quadratic or exponential functions;

V. CONTENT:

A. Quadratic Equations and Applications
   1. Solve quadratic equations
      a. Method of square roots
      b. Quadratic formula
   2. Applications in welding

B. Functions
   1. Definition
   2. Distinguishing between functions and relations
   3. Multiple representations
      a. verbal
      b. numerical
      c. graphical
      d. symbolic
   4. Evaluation of functions
   5. Domain and range

C. Modeling with functions, with an emphasis on applications in welding
   1. Linear function models
   2. Linear regression models
   3. Quadratic function models
   4. Exponential function models

VI. METHODS OF INSTRUCTION:

A. **Audio-visual Activity** - Web-based and/or videos embedded in an e-text
B. **Classroom Activity** - Collaborative learning activities
C. Homework
D. Assigned readings with questions to be answered in writing
E. **Lecture** -

VII. TYPICAL ASSIGNMENTS:

A. Homework
   1. Problems from the text should be assigned for each section covered. The number of problems assigned may vary from section to section and from instructor to instructor, but the homework assignments should include a sufficient number and variety of problems to develop both skill and conceptual understanding. A typical assignment should take an average student 1 to 2 hours for each hour in class.
   2. The majority of the problems assigned should be those for which answers are readily available so that students may obtain immediate feedback on their work.
   3. Homework assignments may include reading the text or viewing tutorial videos. An instructor may require written work in conjunction with such assignments (e.g., have students complete a Q & A sheet related to the assigned reading or tutorial).

B. Classroom Activity
   1. Collaborative learning, done in small groups of 2-4 students, can be used to introduce new concepts, build skills, or teach problem solving.
   2. Sample Collaborative learning assignment: Students explore the differences between linear, quadratic and exponential growth by developing numerical and graphical representations of these three functions. They create linear and exponential models showing the growth of money over time and determine which model will yield the most money.

VIII. EVALUATION:

A. **Methods**

   1. Exams/Tests
   2. Quizzes
   3. Home Work
   4. Other:
      a. Collaborative group activities in class

B. **Frequency**

   1. Recommend a minimum of two exams plus the final exam
   2. Homework should be assigned for each section covered
   3. The number of quizzes and collaborative activities are at the discretion of the instructor

IX. TYPICAL TEXTS:

1. Carman, Robert, and Hal Saunders. *Mathematics for the Trades.* 10th ed., Pearson Higher Education, Inc., 2015.
2. Ewan, Dale. *Elementary Technical Mathematics.* 12th ed., Cengage, 2019.
3. Peterson, John, and Robert Smith. *Introductory Technical Mathematics.* 7th ed., Cengage, 2019.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. Scientific calculator