Math 125 Technical Mathematics

Credit Hours: 4

Scheduled hours per week

Lecture: 4
Lab: 0
Field Experience: 0

Catalog Course Description: Provide students with a basic understanding of the algebraic and trigonometric concepts that are necessary to successfully advance in technological fields.

Pre-requisites: N/A
Co-requisites: N/A

Course Learning Outcomes (CLO):

1. Students will be able to calculate length, weight, mass, area, volume, and surface area of two and three-dimensional geometric shapes and irregular areas using both English and Metric Units.
2. Students will be able to solve application problems involving right triangles.
3. Students will be able to determine the accuracy and precision of a number, greatest possible error, relative error, and percent error.
4. Students will be able to identify similar geometric figures.
5. Students will be able to solve for the algebraic signs of the trig functions for any angle, the trig functions for radian measured angles, and the inverse trig functions, and applications of radian measured angles.
6. Students will be able to operate in different base systems such as binary, hexadecimal and octal.

CLO Assessment Methods: Each CLO may be assessed using homework, tests, and quizzes.

Topics to be studied:

- Ratio and Proportion
- Unit Conversions (Metric, US Customary, Time, Temp and Current)
- Numeration (Binary, Hexadecimal, Octal)
- Significant Digits
- Accuracy and Precision
- Relative and Percent Error
- Literal Equations (Area, Volume and Formulas with 1 or more variables)
- Solving Linear Equations
- Exponent Laws
- Scientific Notation
- Polygons
- Similar Geometric Figures
- Classifying Angles
- Right Triangle Trig (with applications)
- Trig Functions (Sine, Cosine, Tangent and Fundamental Identities)
- Trig Functions of Any Angle
- Inverse Trig Functions
- Radians (with applications)
- Area of a Sector of a Circle

- Arc Length

Relationship of Course to Program Learning Outcomes (PLO) or Institutional Learning Outcomes:

This course has been approved as a Foundational Learning Course under the ILO Category of Quantitative Reasoning.

Institutional Learning Outcomes for Quantitative Reasoning
Related to Math 125 Course Learning Outcomes:

- Course Learning Outcome **#4** and **#6** relate to the first Quantitative Reasoning ILO: "***Interpretation***– *the ability to find and use necessary information presented in mathematical forms such as equations, graphs, diagrams, tables, words, etc. and strategize a method of solution.*" Clearly, CLO #4 deals with identification of similar geometric figures. CLO #6 requires students to identify expanded forms of different bases and then strategize a method to convert between them.
- Course Learning Outcome **#2, #5, and #6** relate to the second Quantitative Reasoning ILO: "***Application and Computation***– *the ability to make estimations, apply singular concepts to multiple applications/contexts, and perform calculations*." CLO #2 requires students to apply things like the Pythagorean Theorem and the definitions of trigonometric ratios to solve right triangle applications. CLO #5 requires students to not only understand the relationship between the trig ratios, the inverse trig functions, and radian measure, but to also perform calculations involving such given information. CLO #6 requires skills in converting (which falls under the learning outcome of interpretation), but it also requires that students know how to operate within the base, for example adding and subtracting binary numbers.
- Course Learning Outcome **#1** and **#3** relate to the third Quantitative Reasoning ILO: "***Analysis***– *the ability to draw appropriate conclusions based on the quantitative analysis of data, checking the answer for accuracy*." CLO #1 requires students to apply the ideas of dimensional analysis to convert units of various dimensions from the U.S. Customary System to the Metric System and vice versa. Estimation and rounding are involved in this process. CLO #3 requires students to apply (and validate) the rules of precision and accuracy when recording and operating with approximate numbers.
- Course Learning Outcome **#1** relates to the fourth Quantitative Reasoning ILO: "***Communication***– *the ability to express organized, logically-connected quantitative evidence that supports and articulates a full mathematical solution*." CLO #1 requires a considerable amount of book keeping in terms of reducing and/or converting units as well as selecting appropriate formulas to visualize a real-world scenario. For example, finding the volume of a rectangular prism in cubic centimeters, but the given dimensions are in inches. Communicating a full solution would require demonstrating not only the unit dimensional analysis but perhaps a sketch of the figure, selecting a formula for volume, demonstrating appropriate substitutions for the variables, and establishing logically connected arguments toward a solution. A great deal of organized, written communication happens there.

Check if approved as: ✖ Foundational Learning Course □ Reinforcement Learning Course

Special requirements of the course: None.

Additional information: None.

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