Miami Dade College

Course Description

MLT1752 | Quality Control Laboratory Mathematics | 2.00 credits

Emphasis on mathematical computations related to procedures in the clinical laboratory including dilutions, solutions, calorimetry, hematology math, enzymatic calculations, calculations relating to renal function tests, and mathematical principles related to ionic solutions. The student will also be given specific statistical tools necessary for quality control procedures as well as interpretations of Levy-Jennings charts and troubleshooting tools.

Course Competencies:

Competency 1: The student will demonstrate knowledge, comprehension, and application in the use of basic mathematical computations by:

1. Performing calculations using fractions.
2. Performing calculations using decimals.
3. Performing calculations with percent.
4. Performing conversions between percent and their decimal representations.
5. Converting between scientific and standard notation.
6. Performing calculations with scientific notation.
7. Solving one variable algebraic equation.
8. Expressing quantities with the proper number of significant figures.
9. Counting the number of significant figures in a given measurement.
10. Converting powers of ten to their decimal representations.
11. Using rounding off rules when reporting results.
12. Performing calculations in ratio and proportion.
13. Performing calculations of weight and volume using the metric system.
14. Performing calculations to convert centigrade to Fahrenheit.
15. Performing calculations to convert Fahrenheit to centigrade.
16. Performing calculations to convert centigrade and Fahrenheit to Kelvin.
17. Performing calculations to convert Kelvin to centigrade and Fahrenheit.

Competency 2: The student will demonstrate knowledge, comprehension, and application in the use and calculations of percent, molar, and normal solutions by:

1. Using the principles of diffusion to explain solutions.
2. Identifying the different types of solutions.
3. Recognizing and identifying expressions of concentration.
4. Performing calculations and solving problems that involving percent, molar, and normal solutions.
5. Performing solution calculations using the ratio & proportion, and volume to concentration formula.
6. Performing calculations for mixed solutions.
7. Performing calculations for v/v solutions.
8. Recognizing and identifying the relationship between Molarity and Normality.
9. Performing calculations to convert Molarity to Normality and vise versa.
10. Performing calculations to convert Normality to percent.
11. Solving Molarity and Normality problems

Competency 3: The student will demonstrate knowledge, comprehension, and application in the use and calculations of dilutions by:

1. Recognizing and identifying the differences between dependent and independent dilutions.
2. Recognizing and identifying the difference between a ratio and a dilution.
3. Using ratio and proportion to solve volume dilutions.
4. Calculating the concentration of a given dilution.
5. Recognizing and identifying the properties of dilutions.

6. Calculating substance concentration.
7. Solving serial dilution problems.
8. Understanding the concept of end point/ titer with respect to dilutions.

Competency 4: The student will demonstrate knowledge, comprehension, and application in the use of quality control in the clinical laboratory by:

1. Recognizing and identifying the necessity for establishing and using quality control in the clinical laboratory.
2. Recognizing and identifying the use of quality control as a troubleshooting tool in the clinical laboratory.
3. Recognizing and identifying the difference between quality assurance and quality control.
4. Recognizing and identifying the difference between a control and a standard.
5. Evaluating parameters for instruments and procedures to determine steps for resolving "out of control" situations.
6. Stating and applying the formula for calculation of the mean.
7. Stating and applying the formula for calculation of the variance.
8. Stating and applying the formula for calculation of the standard deviation.
9. Stating and applying the formula for calculation of the coefficient of variation.
10. Recognizing and identifying trends, and shifts in control data using the Levey- Jennings chart.
11. Applying the Westgard Rule to quality control decisions.

Learning Outcomes:

1. Communication
2. Numbers / Data