

MAT 110
MATHEMATICAL MEASUREMENT

COURSE DESCRIPTION:

Prerequisite: MAT 070 or satisfactory score on placement test.

Corequisite: None

This course provides an activity-based approach to utilizing, interpreting, and communicating data in a variety of measurement systems. Topics include accuracy, precision, conversion, and estimation within metric, apothecary, and avoirdupois systems; ratio and proportion; measures of central tendency and dispersion; and charting of data. Upon completion, students should be able to apply proper techniques to gathering, recording, manipulating, analyzing, and communicating data. Course Hours Per Week: Class, 2, Lab, 2. Semester Hours Credit, 3.

LEARNING OUTCOMES:

1. Students will be able to perform conversions between different systems of measurement and read and interpret commonly used medical units, abbreviations, and charts. Students will display proficiency by demonstrating the following competencies:
 - a. Express Arabic numbers as Roman numerals and express Roman numerals as Arabic numbers.
 - b. Use the metric system, the apothecary system, the household system, and the avoirdupois system, and convert numbers within and between these systems.
 - c. Convert between the traditional and the 24-Hour clock.
 - d. Convert between Kelvin, Celsius and Fahrenheit temperature.
 - e. Use units and milliequivalents for dosage calculations.
 - f. Determine significant digits, accuracy, and precision for given numbers.
 - g. Read and interpret calibrations of common medical utensils.
 - h. Interpret medication orders using standard medical abbreviations.
 - i. Read and interpret nomograms.

2. Students will be able to perform algebraic operations involving ratios and proportions and apply these concepts to solve problems related to medical dosage calculations. Students will display proficiency by demonstrating the following competencies:
 - a. Perform arithmetic operations with fractions, decimals, and percents.
 - b. Calculate ratios and solve proportions.
 - c. Solve simple equations.
 - d. Calculate standard oral dosages of drugs.
 - e. Calculate parenteral dosages of drugs.
 - f. Calculate concentrations of reconstituted drugs.
 - g. Calculate insulin dosages.

- h. Calculate dosage adjustments for pediatric orders.
 - i. Express dosage strengths as percentage solutions.
 - j. Calculate adjustments for concentrations of solutions.
3. Students will be able to apply descriptive and inferential statistics in order to analyze data and make predictions. Students will display proficiency by demonstrating the following competencies:
- a. Find the mean, median, mode, and midrange for sample data.
 - b. Read and construct statistical graphs.
 - c. Compute the range and standard deviation for sample data.
 - d. Use the normal curve to interpret information about normally distributed data.

OUTLINE OF INSTRUCTION:

- I. Basic Arithmetic Computations in Health Applications
 - A. Introduction to Mathematics as Used in the Allied Health Field
 - B. A Review of Operations with Fractions
 - C. A Review of Operations with Decimals
 - D. A Review of Operations with Percents
 - E. Conversions Among Fractions, Decimals, and Percents
- II. A Review of Algebra
 - A. Signed Numbers and the Order of Operations
 - B. A Review of Solving Linear Equations
 - C. A Review of Ratios and Proportions
 - D. Solving Percentage Problems
 - E. Using Formulas
 - F. Modeling Medical Applications
- III. Systems of Measurement
 - A. Measurement Fundamentals
 - B. Scientific Notation
 - C. Significant Digits and Rounding
 - D. The Metric and SI Systems
 - E. Household Measurement Units
 - F. The Apothecary System
 - G. Converting Between Measurement Systems
 - H. Temperature Scales
- IV. Medication Labels, Prescriptions, and Syringe Calculations
 - A. Reading Medication Labels and Inserts

- B. Abbreviations Used on Prescriptions and Medical Orders
- C. Reading and Interpreting Prescriptions and Medical Orders
- D. Syringe Calculations

V. Modeling Health Applications with Ratios and Proportions

- A. Introduction
- B. Ratios and Proportions in Dosage Calculations
- C. Ratios, Proportions, Formulas, and Dimensional Analysis in Multistep Dosage Calculations
- D. Ratios and Proportions in Preparation of Solutions

VI. The Basics of Statistics

- A. Introduction to Statistics
- B. Constructing and Interpreting Graphs
- C. Measures of Central Tendency
- D. Understanding Range, Standard Deviation, and the Coefficient of Variation
- E. The Normal Distribution and Control Charts

REQUIRED TEXTBOOK AND MATERIALS:

Timmons, Daniel L. and Catherine W. Johnson. Math Skills for Allied Health Careers . Prentice Hall, 2008.

Calculator

STATEMENT OF DISABILITIES ACCOMMODATION:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.