STRANDS AND STANDARDS
MEDICAL MATH

Course Description
An instructional program that prepares students with skills to compute mathematical equations related to healthcare. The course integrates medical-physiological concepts and mathematics. Students will engage in math activities including problem solving, reasoning and proof, communication, connections, and representations.

<table>
<thead>
<tr>
<th>Intended Grade Level</th>
<th>11-12</th>
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<tbody>
<tr>
<td>Units of Credit</td>
<td>0.5</td>
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<tr>
<td>Core Code</td>
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<td>Concurrent Enrollment Core Code</td>
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<tr>
<td>Prerequisite</td>
<td>Secondary Math II PLUS a health science course</td>
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<tr>
<td>Skill Certification Test Number</td>
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<td>Test Weight</td>
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<td>License Type</td>
<td>CTE and/or Secondary Education 6-12</td>
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<td>Required Endorsement(s)</td>
<td>Medical Math</td>
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<tr>
<td>Endorsement 1</td>
<td>N/A</td>
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<tr>
<td>Endorsement 2</td>
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<tr>
<td>Endorsement 3</td>
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ADA Compliant: August 2018
STRAND 1
Uses of Mathematics in healthcare.

Standard 1
Analyze the use of medical mathematics in the healthcare system.

STRAND 2
Common Mathematical Operations as used in Real World Healthcare.

Standard 1
Compute fluently and make reasonable estimates.
- Evaluate and simplify numerical expressions containing real numbers using the order of operations.
- Compute solutions to problems and determine the reasonableness of an answer by relating them to the real problem.
- Whole numbers
  - Supplies and inventories
  - Intake and output
  - Cholesterol
  - Quantities
  - Nutrition
  - Vital signs labs
  - Lever systems

Standard 2
Represent real numbers in a variety of ways.
- Choose appropriate and convenient forms of real numbers for solving problems and representing answers, e.g., decimal, fraction, or percent.
- Decimals
  - Tools, instruments
  - Nutrition
  - Weights
  - Estimation
  - Temperature
  - EKG’s
  - Medications
  - Labs

Standard 3
Identify relationships among real numbers and operations involving these numbers.
- Fractions
  - Tools, instruments
  - Weights
• Estimation
• EKG’s
• Medications
• Labs
• Conversions (F, C)

**Standard 4**
Calculate percentages.
  • Percents
    • Solutions
    • Labs
    • Growth Charts
    • Medications
    • Target heart rate
    • Stroke volume
    • Cardiac output
    • Blood loss
    • Body surface area, burns
    • Oxygen

**STRAND 3**
**Ratios and Proportions**

**Standard 1**
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
  • Solve proportions that include algebraic first-degree expressions.
  • Nutrition

**Standard 2**
Use ratios to compare data.
  • Labs

**Standard 3**
Medications

**Standard 4**
Diseases

**STRAND 4**
**Gathering Data (Use of Medical Instruments)**.

**Standard 1**
Use patterns, relations, and functions to represent mathematical situations.
  • Conversions
• Metric units
• Time (12/24 hour)
• Roman numerals (Arabic/Roman)
• Temp (C/F)
• Apothecary

**Standard 2**
Represent quantitative relationships using mathematical models and symbols.
- Find and interpret rates of change by analyzing graphical and numerical data.
- Instruments
  - IV, flow rates
  - Macro/micro drops (tubing)
  - Syringes
  - Rulers, tape measures
  - Scales
  - Goniometry, ROM
  - Centrifuges
  - Sphygmomanometer gauges
  - Pulse oximeters, oxygen flow rates
  - Thermometers

**Standard 3**
Solve problems using visualization, spatial reasoning, and geometric modeling.

**Standard 4**
Understand measurable attributes of objects and the units, systems, and processes of measurement.

**STRAND 5**
**Interpreting Data**

**Standard 1**
Formulate and answer questions by collecting, organizing, and analyzing data.
- Collect, record, organize, and display a set of data.
- Determine whether the pattern of the data is linear or nonlinear when given in a list, table, or graph.
- Interpret the correlation between two variables as positive, negative, or having no correlation.
- Find a line of best fit by estimation, choosing two points, or using technology for a given set of data.
- Analyze the meaning of the slope and y-intercept of a line of best fit as it relates to the data.
- Make predictions based on a line of best fit.
- Find mean, median, mode, and range for a data set.
• Analyze the meaning of the maximum or minimum and intercepts of the regression equation as they relate to a given set of bivariate data.
• Make predictions and estimations and determine their reasonableness using a regression equation.
• Graphs and charts
  • Interpreting charts and graphs
  • Temperature, pulse, respiration graphs
  • Intake and output charts
  • Height, weight, measurement graphs
  • Cardiac output
  • Medication errors
  • Census
  • Acuities
  • Disease, mortality rates
  • Job outlook, projections
  • Treatments
  • Differential diagnosis
  • Health care costs
  • Effectiveness (facilities, providers)
  • Wellness indicators
  • Reliability and validity
  • Body mass index
  • Statistics
  • Epidemiology

Standard 2
Apply basic concepts of probability.
  • Determine and express the probability of an event as a fraction, percent, ratio, or decimal.

Standard 3
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
  • Solve systems of two linear equations or inequalities:
    • Numerically; e.g., from a table
    • Algebraically
    • Graphically
    • Using technology

Standard 4
Identify relationships among real numbers and operations involving these numbers.
  • Identify matrices that can be added, subtracted, or multiplied.
  • Demonstrate that matrix multiplication is not commutative.
STRAIN 6
Math for Medications

Standard 1
Compute fluently and make reasonable estimates.
- Reading drug labels and prescriptions

Standard 2
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Simplify and evaluate numerical expressions (including integer exponents and square roots), algebraic expressions, formulas, and equations.
- Using medical reference books to determine if calculated dosages are safe

Standard 3
Represent quantitative relationships using mathematical models and symbols.
- Dosing

Standard 4
- Patient instructions

STRAIN 7
Medical Accounting and Business

Standard 1
Compute fluently and make reasonable estimates.
- Numerical filing

Standard 2
Represent real numbers in a variety of ways.
- Appointment scheduling

Standard 3
Identify relationships among real numbers and operations involving these numbers.
- Calculating cash transactions

Standard 4
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Maintaining accounts

Standard 5
Checks, deposit slips, and receipts

Standard 6
Paycheck calculation
Standard 7
Budgeting

Standard 8
Depreciation, amortization

Standard 9
Insurance

**STRAND 8**
Exponents and Logarithms

**Standard 1**
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Radiation exposure

**Standard 2**
Determine measurements using appropriate techniques, tools, and formulas.
- Half life

**Standard 3**
Use properties of logarithms and exponents to solve equations.
- pH

**Standard 4**
- Research data