

Hostos Community College
Department of Mathematics

MAT 105 MATHEMATICS FOR ALLIED HEALTH SCIENCES

Credits Hours: 3.0

Equated Hours: 3.0

Class Hours: 3.0

Pre-requisite: Passing Score on the Compass/CMAT Test

Pre/Co-requisite ENG091 or ESL091

Required Text(s): MATHEMATICS FOR ALLIED HEALTH SCIENCES
AUTHOR: Lacay, J., Baker, W., Gibbons, D.
PEARSON CUSTOM PUBLISHINGS 2008 2nd Ed.
Mathxl software

Description: This course is designed for Allied Health majors and will aid them in applying mathematical concepts to on-the-job situations. The course will include: an integrated review of the mathematical skills required in Allied Health Professions, in particular those topics pertaining to Pharmacology and Radiology.

Instructional Objectives:

The course is designed:

- 1) To reinforce students' knowledge of basic mathematics and algebra
- 2) To familiarize student with the common systems of measurements used in the medical field
- 3) To expose students to the techniques used in medical dosages calculations
- 4) To expose students to the use of direct, direct square, inverse and inverse square proportions in solving variation problems, i.e. evaluating how technique changes effect the imaging process in radiography
- 5) To expose students to calculating IV and IVPB flow rate at drip chamber, pump and medication flow rates
- 6) To familiarize students with the use of exponents, scientific notation and logarithms in solving application problems

Learning Outcomes:

At the completion of this course the student should demonstrate proficiency with the use of:

- 1) Basic arithmetic and algebra skills to solve practical problems involving; metric, Apothecary and Household units
- 2) Conversion between systems of measurements as well as within a given system of measurement
- 3) Calculation of dosages in problems involving: tablets, solutions for oral medication, adult and pediatric medications
- 4) Conversion between the Celsius and Fahrenheit temperature systems
- 5) Ratios to solve practical problems such as conversions between radiographic grids
- 6) Proportional equalities to solve variation problems involving: direct, inverse and inverse squared proportions
- 7) Scientific Notation, exponents and logarithms
- 8) Student will be able to determine the correct flow rate at the drip chamber, pump and medication flow rate. They will be able to calculate actual dose and compared this to prescribed dose using the per body weight and BSA terminology as well as calculate the time of an IV infusion

Examinations: **A Midterm 20% and Departmental Final 40% will be given along with two partial exams.**

Grades: **A, A-,B+,B,B-,C+, C, F**

Course Outline:

Week One: Review of Basic Mathematics Skills with applications to Measurement and Medical Dosage Calculation

Ratio, Rates, Proportions & applications to Nursing and Radiology

Week two: Dimensional Analysis

English System & Metric system of measurements

Application to Nursing & Radiology

Conversion between Measurement System The Apothecary, Household and Metric systems

Temperature Conversion Fahrenheit and Celsius

Week three and four: Nursing: Medical Measurements and Medication

1. Calculating Medication Dosage involving Apothecary, Household and Metric Units in tablet form, prescribed versus recommended dose.
2. Calculating Medical Dosage of Oral Suspension, prescribed versus recommended dose.

Week five: Review and Test #1

Week six: Radiology: Direct and Direct Square Variations

1. Direct Proportions: Radiographic Grids, conversion between grids
2. Direct Squared Proportions such as: Time and Square Distance, Milliamps and Square Distance

Week seven: IV medication flow rates

IV flow rates conversion between drip chamber (gtt/min) and pump flow rate (ml/h) calculating time an IV infusion will take to complete.

Week eight Review and Test #2 MIDTERM

Week nine & ten IV with medication and IVPB

Application Problems involving IV and IVPB drug solutions, calculating volume rate flow, drug infusion rate and time of infusion. Prescribed versus recommended dosage presented by kg of body weight or BSA.

Week eleven Inverse and Inverse Square Variations

1. Inverse Proportions such as: Screen Speed and mAs
- 2 Intensity and Distance (Inverse Square Law)

Week twelve Review and test #3

Week thirteen Exponents, Scientific Notation and Logarithms

1. Rules of exponents, Powers of 10 and Scientific Notation
2. Definition of Logarithms, Characteristic and Mantissa
3. Properties of Logarithms and Determining Logarithms using Tables

Week fourteen Review for Final Exam