LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
MATHEMATICS, ENGINEERING, & COMPUTER SCIENCE DEPARTMENT

MAT 105 – MEDICAL DOSAGE CALCULATION WITH PRE-ALGEBRA

4 HOURS, 2 CREDITS

Catalogue Description:

This course is designed for future health care professionals in the fields of Nursing and Veterinary technology. The course introduces students to the essentials of medication administration process. Students become familiar with both the metric and household systems of measurement. Calculation of oral and parenteral doses are taught. Calculations based on the size of the client as measured by weight or body surface area are included. Students will learn to calculate both intravenous and enteral dosages rates and flow rates. The mathematics for intravenous push and the construction of titration tables are demonstrated. Pediatric dosages are calculated along with Daily Fluid Maintenance. Safe practices are stressed throughout the course. The arithmetic and algebraic skills relevant to the subject are included in the course.

Instructional Objective

1. Provide students with the arithmetic and algebra skills necessary to take college level courses.
2. Familiarize students with the common systems of measurement used in healthcare.
3. Introduce students to the techniques used in medical dosage calculations
4. Introduce the students to techniques for pediatric dosage administration.
5. Calculate dosages for oral, parenteral, and intravenous means of administration.

Performance Objective

1. Illustrate their knowledge of arithmetic and algebra.
2. Convert units of measure from one system to another, as well as within a given measurement system.
3. Calculate dosages for oral medication and parenteral therapy.
4. Compute pediatric dosages and solve practical problems involving pediatric medications.
5. Compute the rate of flow, dosage rate and durations of intravenous infusions.

COURSE MATERIALS

Textbook:

1. **Medical Dosage Calculations – A Dimensional Analysis Approach – 11th Edition** by Olsen, Giangrasso and Shrimpton, Pearson Prentice Hall Publishing, 2016.

2. *Elementary Algebra,* Senior Contributing Authors: Lynn Marecek, MaryAnne Anthony-Smith. Free online textbook is available at OpenStax *https://openstax.org/details/books/elementary-algebra.*

Required Online Platform: https://www.myopenmath.com Course ID will be distributed by individual instructor.

Videos: Animated Camtasia videos have been prepared on all the healthcare topics, and are available to the students on a YouTube playlist. Videos on all the mathematics topics will be integrated into the MyOpenMath platform.

EVALUATION

In order to achieve a passing grade, a student must successfully complete class work, class tests, project and final exam. For purposes of computing the final grade, the suggested weighting is:
Homework: 10%
Instructor Exam (2@25%): 50%
Project: 10%
Final Exam: 30%

Assignments: For the healthcare topics at the end of each chapter there are **Practice Sets.** In these Practice Sets the **Try These for Practice** questions, the **Exercises** and the **Cumulative Review Exercises** are done by the students. The **Additional Exercises** and **Case Studies** are optional. For the mathematics topics the homework will be assigned and submitted through the MyOpenMath platform. The instructor exams and the final exam will be given through Blackboard.

ATTENDANCE

Students are expected to attend all class meetings. Students are responsible for all information, material, and assignments covered in class regardless of class attendance. Students should consult the college catalog to find out the terms and conditions under which a WU, INC, or F grade may be given to a student.

Academic Integrity

This class will be conducted in compliance with LaGuardia Community College's academic integrity policy. (See college catalogue for details)

Course Content Outline

Week 1: The Drug Administration Process; Six Rights; Medication Orders and Administration Records; Drug Labels and Package Inserts
Lab 1: Primes, Building and Reducing Fractions; Multiplying and Dividing Fractions
HW 1

Week 2: Dimensional Analysis applied to calculating equivalent Single Units of Measurement and equivalent Rates.
Lab 2: Ratios; GCF and LCM; Adding and Subtracting Fractions
HW 2

Week 3: Calculations performed Within the Household and Metric Systems
Lab 3: Operations with Decimal numbers; Operations with Powers of 10; Rounding Off, Up and Down; Conversion between Fractional and Decimal forms
HW 3

Week 4: Calculations performed Between the Household and Metric Systems
Lab 4: Percent's; Percent of increase and decrease; Interchanging Fractions, Decimals and Percent's
HW 4

Week 5: Oral Medications; Dosages based on the Size of the client
Lab 5: Exponents and Square Roots
Exam 1: Covering the content of Weeks 1-4
HW 5

Week 6: Syringes and Insulin
Lab 6: Order of Operations
Project assigned
HW6

Week 7: Solutions with both liquid and dry Solutes
Lab 7: Operations with Signed Numbers
HW 7

Week 8: Parenteral Medications
Lab 8: Operations with Monomials
HW 8

Week 9: Calculations for Enteral and Intravenous Solutions; flow rates; Volumes and Durations of Infusions.
Lab 9: Operations with Polynomials
Exam 2: Covering the content of Weeks 5-8
HW 9

Week 10: Calculations for Intravenous Medications; dosage rate
Lab 10: Solving single variable equations including Proportions
HW 10

Week 11: IV Push; Titrated Medications and orders with compound rates
Lab 11: Graphing the solutions of Equations with two variables

Project Due
HW 11

Week 12: Pediatric Dosages; Daily Fluid Maintenance
Lab 12: Review for Final Exam
HW 12

Week 13: Final Exam