

**BOROUGH OF MANHATTAN COMMUNITY COLLEGE**

City University of New York

**Department of Mathematics**

**Mathematics for Health Sciences**

**MAT 104**

**Credits: 3**

**Class hours: 3**

**Instructor Information**

**Office:**

**Phone:**

**Email:**

**Office Hours:**

**Course Description**

This course covers computations and measurements essential in the health science professional fields with an emphasis on nursing. Topics include units and systems of measurement, oral and parenteral dosage calculations, reconstitution of powdered medications, adult and pediatric dosage calculations based on body weight, and intravenous and critical care dosage calculations.

**Prerequisites/Co-requisites**

MAT 012 or MAT 051 if necessary

**Student Learning Outcomes**

Upon completion of the course, students will be able to:

- Read and write drug orders in the metric, apothecary, and household systems and be able to convert units of mass, volume, temperature, length, and weight within and between these systems.
- Read, interpret, and document information on medical administration records.
- Read and interpret information on medication labels, and use this information to correctly describe reconstitution procedures and to calculate the volume needed to administer drug dosages.
- Choose an appropriate syringe and mark syringes to indicate how drugs, including insulin and multiple drugs administered in the same syringe, would be measured.
- Calculate dosages and dosage ranges for drugs based on weight and body surface area and assess ordered dosages of these drugs for safety.
- Calculate flow rate, dosage rate and infusion time for IV administration, including heparin and titration, and label IV fluid bags with progress and completion times.
- Assess whether the outcome of a given calculation is reasonable through quick mental estimation, checking answers against recommended ranges, and solving a problem using multiple methods.

**Required Text & Readings**

Morris, Deborah Gray. *Calculate with Confidence*, fourth edition. Elsevier Inc., 2006.

**Evaluation & Requirements of Students**

At the beginning of the semester, the instructor will advise the students of the determination of the final grade. Students are required to attend all scheduled classes.

## Outline of Topics

Section	Title	Chapters	Pages
One	<b>Refresher Math</b> Roman Numerals, Fractions, Decimals, Ratio/Proportion, Percentages	1-5	7-56
Two	<b>Systems of Measurement</b> Reading and writing drug orders in the Metric, Apothecary, and Household Systems, Conversion within and between systems	6-9	63-103
Three	<b>Medical Abbreviations, Orders, Charts, Labels</b> The Six Rights of Medication Administration, Routes of Medication Administration, Equipment Used for Medication Administration, Reading and Writing Medication Orders, Reading, Interpreting, and Documenting Information on Medical Administration Records, Military Time	10-13	111-168
Four	<b>Calculation of Simple Oral and Parenteral Medications</b>	14-18	185-327
Five	<b>Reconstitution of Solutions</b>	19	351-366
Six	<b>Insulin</b>	20	389-402
Seven	<b>Dosage Calculations Based on Weight and Body Surface Area*</b>	21	415-444
Eight	<b>IV Administration</b> Calculation of Flow Rate and Infusion Time, Labeling IV bags	22	461-519
Nine	<b>Critical Care Calculations</b> Heparin calculations, Calculating Dosage Rate, Titration of Infusions	23-24	535-558

\* Pages 436-444 are optional

### College Attendance Policy

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

### Academic Adjustments for Students with Disabilities

Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

### BMCC Policy on Plagiarism and Academic Integrity Statement

Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's web side, [www.bmcc.cuny.edu](http://www.bmcc.cuny.edu). For further information on integrity and behavior, please consult the college bulletin (also available online).