



School of Health Related
Professions

Department of
Interdisciplinary Studies

IDST 1400
Medical Mathematics

Course Description

This course will provide a review of basic mathematical calculations and will instruct the learner on how to convert equivalents from one system to another and accurately mix and measure drugs. Emphasis will be placed on how these techniques are used in the administration of medications for patient use.

Credits/Modes of Instruction

This is 3 credit course (~45 hours) that relies on hands-on activities, assignments, and discussion. Should the instructor feel that a class meeting(s) is necessary, she/he will notify all student(s) via email or telephone of the class meeting time and location. The course instructor will organize the class in coordination with Rutgers School of Health Related Professions syllabus, and communicate requirements with student, either by email or telephone.

Pre/Co requisites

All math remediation and successful high school completion of Dynamics of Health Care in Society

Instructor

The instructor will be a Rutgers SHRP faculty (or adjunct) member.

Course Goals and Objectives

Goals

The goals of this course is to provide a review of basic mathematical calculations, to instruct the learner on how to convert equivalents from one system to another and accurately mix and measure drugs, and to provide the learner with the necessary mathematical background needed for pharmacology.

Objectives

The objectives of this course will be met via on site participation/hands on learning, required readings, assignments, and discussions with preceptor.

1. Read and write the basic Roman numerals for their Arabia equivalents with 100 percent accuracy.
2. Explain the meaning of a fraction and give an example of each type of fraction.
3. Convert between improper fractions and whole or mixed numbers.
4. Give the fundamental principles used in computing with fractions and give an example of each one.

5. Demonstrate accurately the addition, subtraction, multiplication, and division of fractions and mixed numbers.
6. Read and write decimals with 100 percent accuracy.
7. Add, subtract, multiply, and divide decimals with 100 percent accuracy.
8. Convert common fractions to decimals and decimals to fractions.
9. Convert percent to decimals, fractions to percent, percent to fraction, and decimals to percent.
10. Use ratio-proportion technique necessary to prepare solutions from pure drugs.
11. Convert temperature from the Fahrenheit scale to centigrade scale and vice versa.
12. Convert from one unit of measure to another using the metric system, apothecary system, and household measures.
13. Demonstrate knowledge and ability to accurately calculate dosages of liquids and solids.

Course Requirements

Requirements for Completion

Attendance is required, as well as completion of all activities and assignments. Students will be required to arrange with preceptor a make up date in case of an absence. Assignments are expected to be submitted on their due date to the course preceptor. Late assignments will be marked down 1 point per day late.

Requirements	Weight
Quizzes	50%
Mid-term and Final Exams	40%
Class Participation	10%
Total	100%

Evaluation and Grading

Grade Determination

The minimum level of satisfactory performance in this course is a 'C' or better. To receive a 'C' or better, students must first complete ALL course requirements specified above, including meeting the minimum attendance expectation.

Upon successful completion of the course students will be eligible to take the Health Science Careers standardized exam to determine college credit.

******All students must attain a C (74) or better to earn college credits. Minimum passing standardized exam grade for all students must be at least 70 before calculations of college transcript grade can be determined.***

Medical Mathematics - 75% Rutgers SHRP standardized exam grade + 25% high school grade = Rutgers SHRP grade listed on transcript.

Health Science Careers Program Grading System

Weighted Average of All Requirements	Final Letter Grade
94-100	A
90-93	A-
87-89	B+
84-86	B
80-83	B-
77-79	C+
74-76	C

Unsatisfactory Performance/Progress

Unsatisfactory performance which may include late assignments and/or attendance or progress problems will be discussed individually on an as needed basis.

Honor Code and Academic Integrity

(Refer to your SHRP Student Handbook at
http://shrp.rutgers.edu/current_students/handbook.pdf)

The faculty of Rutgers School of Health Related Professions believes that students must observe and support high standards of honesty and integrity. For this reason, all students in this course are expected to abide by the School's Honor Code and uphold its Code of Academic Integrity. As described in detail in your Student Handbook, violations of the Code of Academic Integrity include cheating, plagiarism, fabrication and/or academic misconduct. All such violations will be considered with gravest concern and may be punishable with sanctions as severe as suspension or dismissal. If you have not previously affirmed the School's Honor Code (either in writing or electronically), you must submit a signed and dated copy of the Honor Code to the instructor by the end of the first week of the semester. The Honor Code form is provided in the current SHRP Student Handbook.

General Learning Resources

Required Textbook(s)

Medical Dosage Calculations, by Ablon Olsen. Giangrasses, Siner and Weissman, 5th edition. Center for Occupational Research and Development (1992). Applied Mathematics. Waco, Texas: Center for Occupational Research and Development.

Course Units/Schedule

Note: this schedule is a plan only, subject to change by the instructor as deemed necessary to achieve the course goals. Whenever possible, you will be notified in advance of any changes, especially those affecting course requirements or grading.

Unit / Week	Topical Outline	Field Activities/Assignments	Evaluation
Unit 1	Review of Arithmetic for Medical Dosage Calculations <ul style="list-style-type: none"> • Diagnostic test of arithmetic • Review of roman numerals • Review of fractions • Changing decimal numbers and whole numbers to fractions • Changing fractions to decimal numbers • Multiplying and dividing decimal numbers and fractions • Complex fractions • Percents 	Convert decimals to fractions, convert fractions to decimals. Round decimals to desired place value. Multiply and divide decimals. Multiply and divide fractions. Simplify complex fractions. Understand commonly used Roman numerals.	Quiz Discussions in class/groups Worksheets
Unit 2	Advanced Review <ul style="list-style-type: none"> • Complex fractions • Percents • Temperature conversions • Ratio and proportions • Problem solving • Estimations 	Write percentages as decimals and fractions. Estimate an answer. Convert Fahrenheit to Celcius, and vice versa. Apply use of ratio and proportions to applied math concepts. Solve practical problems encountered by health care workers. Estimate an answer. Write percentages as decimals. Write percentages as fractions.	Quiz Discussions in class/groups Worksheets
Unit 3	Metric System <ul style="list-style-type: none"> • Introduction to dimensional analysis • Volume of liquids in the metric system • Weight in the metric system 	Identify metric system units of measure. State abbreviations for metric system. Use method of dimensional analysis.	Quiz Discussions in class/groups Worksheets
Unit 4	The Apothecary and Household systems	Identify household units of measure. State	Quiz and/or unit test Discussions in

	<ul style="list-style-type: none"> • Volumes of liquids in the apothecary system • Volumes of liquids in the household system • Weight in the household system 	<p>abbreviations for household systems. State equivalents for household system. Convert within household system. Identify apothecary system units of measure. State the equivalents of the apothecary system. Convert within the apothecary system.</p>	<p>class/groups</p> <p>Worksheets</p>
Unit 5	<p>Converting from one system to another</p> <ul style="list-style-type: none"> • Conversion of milligrams to grains • Conversion of grains to milligrams • Conversion of grams to grains • Conversion of grains to grams • Conversion of household measurement to the apothecary or metric system 	<p>State the equivalents of units of weight, volume, and length among metric, household and apothecary systems. Convert from one unit to another among the three systems.</p>	<p>Quiz</p> <p>Discussions in class/groups</p> <p>Worksheets</p>
Unit 6	<p>Preparation of solutions</p> <ul style="list-style-type: none"> • Strength of solutions • Preparing solutions from pure drugs • Diluting stock solutions 	<p>Identify methods to accurately calculate dosages of liquids and solids, and mix and measure drugs.</p>	<p>Quiz and/or unit test</p> <p>Discussions in class/groups</p> <p>Worksheets</p>