PMT 101 Pharmaceutical Calculations

Syllabus

Academic Year 2013 - 2014

<u>PHARMACEUTICAL CALCULATION</u>: This course develops a solid base in the principles of Ratio and Proportion Dosage Calculation. The course includes operations and applications of ratios, proportions, fractions and decimals, percent in community pharmacy (compound preparation, dosage, refill, dispensing fee, co-pay, discount, gross and net profit, pricing, inventory control) and institutional pharmacy (parenteral doses, powdered drug preparation, dosage calculations based on weight and surface area, infusion and drip rates, dilutions, allegation, medical label).

Prerequisite Requirement: None

CREDITS: 3

INSTRUCTOR: **Richard Yost, Pharm.D., Room 111, Chelsea**

   rlyost@bhcc.mass.edu

   Tel: 617-228-3366

Office Hours: Monday and Wednesday 12:30 - 1:30, Tuesday and Thursday 10:00 - 11:00

Required Course Materials:

   Pharmacy Calculation, Powers and Walkelin, 4th edition
   (ISBN-978-1-61731-074-4)

Calculator: The use of any calculator is allowed except cell phone calculator

Objectives and Teaching Procedures: The objectives of dosage calculation are listed at the beginning of each of the assigned textbook sections. A variety of instructional modes will be used in working toward these objectives. Class meetings will consist of whole class discussions as well as individual work.

TEACHING PROCEDURES:

- Lectures and discussions based on material in the text will emphasize immediate feedback from the students to determine comprehension.
- Students will be asked to participate in classroom discussion by describing solutions to problems and bringing experiences from the clerkship into discussion in the classroom.

EDUCATIONAL PHILOSOPHY:

Students are expected to learn and demonstrate study and work skills that will give them the opportunity to succeed in both the classroom and the workplace. Some of the skills that will allow the student to become a "healthcare professional" are having good attendance, being punctual, reading assigned parts of the text, asking questions, taking notes, listening carefully, studying and reviewing class material, and taking part in classroom discussion.

We expect students to demonstrate the respect that every person desires by being courteous to the instructor and to fellow students and by showing consideration to others. In this regard please adhere to the following policies:

- **ALL CELL PHONES MUST BE OFF DURING CLASS TIME.**
- UNLESS GROUP WORK IS BEING DONE IN THE CLASSROOM, ONLY ONE PERSON SPEAKS AT A TIME.
- ARRIVING TO CLASS LATE SHOWS DISRESPECTFUL BEHAVIOR AND DISRUPTS THE FLOW OF LEARNING.
- PERIODIC BREAKS WIL BE TAKEN. STUDENTS MUST NOT LEAVE CLASS WHILE THE LECTURE IS IN PROGRESS. THIS IS DISRUPTIVE AND DISRESPECTFUL.
- CHEATING IS UNACCEPTABLE BEHAVIOR. IT INCLUDES CHEATING ON TESTS AND COPYING HOMEWORK FROM TEXTBOOKS OR OTHER STUDENTS.
- YOU WILL BE GIVEN PERIODIC BREAKS DURING CLASS. STUDENTS MUST NNOT LEAVE CLASS WHILE THE LECTURE IS IN PROGRESS. THIS IS DISRUPTIVE TO THE CLASS AND DISRESPECTFUL.

All disrespectful behavior will be addressed according to the academic policies and procedures of the College.

By working together much can be achieved. If the student is having any problems that make it difficult to do this work and or to attend classes, he or she should speak to the instructor immediately. Many times the instructors and staff can work with and assist the student to solve these problems and to succeed in completing the program.

HOMEWORK:

Your homework will be to read the assigned pages in the text BEFORE coming to class. Complete any other handouts or assignments that are given. If you are absent, it is your responsibility to do the homework and pass it in during the **NEXT** scheduled class you attend.

HOW YOUR GRADE IS COMPUTED:

- Tests will be on material covered during class. The exams and quizzes will be multiple choice (choosing the best out of 4 possible answers) and short answer. Bonus questions, if any, will be short answer questions.
- If you earn less than **80%** on any quiz you should make an appointment with the instructor to go over the exam and demonstrate that you understand the material.
- If you are absent for an exam/quiz and **do not call** the instructor **BEFORE** the class you will lose **the privilege of taking a make-up exam/quiz.**
- Use of electronic or paper dictionaries during exams is not allowed.

- The course (and the textbook) will be broken into three segments.
    - o Section 1 Chapters 1 - 15
    - o Section 2 Chapters 16 - 26
    - o Section 3 Chapters 27 - 37
- Approximately five weeks of the semester will be devoted to each of the three sections.
- For each section there will be 3 - 4 quizzes and one exam.
- The final exam will be all inclusive of the material covered in the final five week course.

Percentage Breakdown of your Final Grade

	Section	Total
Each Exam	15%	45%
Homework	5%	15%
Each Quiz	5%	30%
Attendance		10%
		100%

A	Equivalent to a numerical grade of	94 - 100
A-	Equivalent to a numerical grade of	90 - 93
B+	Equivalent to a numerical grade of	87 - 89
B	Equivalent to a numerical grade of	83 - 86
B-	Equivalent to a numerical grade of	80 - 82
C+	Equivalent to a numerical grade of	77 - 79
C	Equivalent to a numerical grade of	70 - 76
D	Equivalent to a numerical grade of	60 - 69
F	Equivalent to a numerical grade of	0 - 59

A grade of "B-" or better in all courses is required for progression in the program.

ABSENCE AND LATENESS POLICY:

Attendance will be taken at the beginning of the period. If you arrive after attendance has been taken, it is counted as a late class. **Frequent absences and lateness will result in a lowered grade or failure of the course.** You will be asked to speak with the instructor to determine and document a plan to deal with the situation if the instructor considers absence or lateness to be a problem.

It is necessary to call the instructor if you are absent. Please leave a message on the appropriate instructor phone number **BEFORE** class begins that you will not be attending class that day. This is what you will be expected to do in a work situation so it is a mandatory part of this program.

Bunker Hill Community College is committed to providing equal access to the educational experience of all students in compliance with Section 504 of the

Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1994. Any students with a documented disability requiring an accommodation should immediately speak to the professor. Students with disabilities, who have not already done so, should schedule an appointment at the Office for Students with Disabilities (Room D106A) to obtain appropriate services.

PHARM COURSE OUTLINE

- The course (and the textbook) will be broken into three segments.
    - o Section 1 Chapters 1 - 15
    - o Section 2 Chapters 16 - 26
    - o Section 3 Chapters 27 - 37
- Approximately five weeks of the semester will be devoted to each of the three sections.
- For each section there will be 3 - 4 quizzes and one exam.
- The exam will be all inclusive of the material covered in the previous five weeks of the course.

Section 1
- Chapter 1 Numeral Systems Used in Pharmacy
- Chapter 2 Numerators, Denominators, and Reciprocals of Fractions
- Chapter 3 Reducing Fractions to Lowest Terms
- Chapter 4 Adding and Subtracting Fractions
- Chapter 5 Multiplying and Dividing Fractions
- Chapter 6 Writing Fractions in Decimal Form
- Chapter 7 Rounding Decimals and Significant Figures
- Chapter 8 Adding and Subtracting Decimal Numbers
- Chapter 9 Multiplying and Dividing Decimal Numbers
- Chapter 10 Using Ratios and Proportions or Dimensional Analysis to Solve Pharmacy Calculations
- Chapter 11 Percents
- Chapter 12 Exponents and Scientific Notation
- Chapter 13 Interpreting Prescriptions and Converting Household and Metric Measurements
- Chapter 14 Converting Apothecary and Metric Measurements
- Chapter 15 Converting Between the Different Temperature Scales and Calculations with Density and Specific Gravity

Section 2
- Chapter 16 Calculations for Compounding
- Chapter 17 Calculations for Days Supply
- Chapter 18 Adjusting Refills for Short-filled Prescriptions
- Chapter 19 Calculations for Dispensing Fees, Co-pays, Difference Pricing
- Chapter 20 Calculations for Billing Compounds
- Chapter 21 Cash Register Calculations
- Chapter 22 Usual and Customary Prices
- Chapter 23 Discounts
- Chapter 24 Gross and Net Profits
- Chapter 25 Inventory Control
- Chapter 26 Daily Cash Report (will not be covered)

Section 3
- Chapter 27 Parenteral Doses Using Ratio and Proportion Calculations
- Chapter 28 Powdered Drug Preparations
- Chapter 29 Percentages
- Chapter 30 Ratio Solutions
- Chapter 31 Dosage Calculations Based on Body Weight
- Chapter 32 Dosage Calculations Based on Body Surface Area

Upon completion of **Pharmacy Calculations**, the student will be able to:

WHOLE NUMBERS
    Round whole numbers
    Solve word problems involving operations with whole numbers
    Order whole numbers using the symbols =, < and >
    Identify factors and multiples of whole numbers
    Define and identify prime and composite numbers
    Express a whole number as a product of its prime factors

FRACTIONS
    Identify and interpret: fraction, numerator, denominator, proper fraction, improper fraction, and mixed number
    Express improper fractions as mixed numbers
    Express mixed numbers as improper fractions
    Write fractions in simplest form
    Identify and find equivalent fractions

    Multiply and divide fractions and mixed numbers
    Add and subtract fractions and mixed numbers
    Simplify fraction expressions including complex fractions
    Compare the size of fractions using =, < and >
    Solve word problems involving fractions and mixed numbers

DECIMALS
    Identify decimal place values
    Round decimal numbers
    Compare the size of decimals using the symbols =, < and >
    Add, subtract, multiply and divide decimal numbers
    Solve word problems involving decimals
    Convert fractions to decimals and decimals to fractions

PERCENTS
    Express percent numbers as fractions and decimals
    Express decimals and fractions as percent numbers
    Find the amount when given percent and base
    Find the percent when given base and amount
    Find the base when given the percent and amount
    Solve applied problems involving sales tax, interest, commissions, and discounts

RATIO & PROPORTION
    Set up and simplify ratios and rates
    Set up and solve proportions
    Solve word problems involving proportions

MEASUREMENTS
Solve problems involving measurements
Express percent relationships in proportion form.

PMT-101 Pharmaceutical Calculations

Solve percentage problems.

Solve word problems involving percent numbers.

Explain how to solve problems dimensional analysis

Demonstrate how to solve common pharmacy problem using ratio and proportion

Convert Roman numerals to Arabic numerals and vice versa

Determine the number of tablets or capsules needed to fill a prescription that has a quantity written in Roman numerals

Identify unit of measurement in the metric and household system

Recognize abbreviations for the units of measurement in the two systems

State the equivalent units for weight, volume, and length

Convert from one unit to another within each of the two systems

State the equivalent units of weight, volume and length between the metric and household systems

Explain the importance of proper storage temperatures for medication

Perform calculations to convert temperature in degree Fahrenheit to degrees Celsius and vice versa

Calculate the one-step and multi –step problems for oral medication in solid and liquid form

Calculate doses for medications measured in milliequivalents

Use nomogram to calculate body surface area

Identify which types of drugs are dosed according to the body surface area

Calculate doses based on weight and body surface area (BSA)

Explain why compounded drugs are sometimes prescribed

Perform calculations to determine the amounts of ingredients needed to prepare compounded prescriptions

Perform days-supply calculations for prescriptions for tablets, capsules, oral liquids, insulin and metered-dose inhalers

Define dispensing fee, describe how co-pays are determined, and define difference pricing

Describe how third party programs are billed for pharmacy compounds

Define usual and customary price for prescription

Describe how usual and customary price can be determined

Describe when pharmacies may offer discount

Demonstrate the ability to calculate discounts

Define net and gross, calculate the gross and net profit for prescription

Explain how minimum/maximum level inventory systems work

Calculate reorder quantities using minimum/maximum inventory level

Demonstrate ability to balance a cash report

Calculate the resulting strength of a solution that has been diluted from a more concentrated strength

Calculate the amount of diluent needed to prepare a less concentrated preparation from a more a concentrated strength

Describe how to set up an alligation

Use alligation to determine how to prepare a concentration of an ingredient from two concentrations of the same ingredient when the desired concentration is in between the concentration of the two available concentrations

Describe the strength of a solution as a fraction, ratio and as a percent

Determine the amount of solute in a given amount for solution

Do the calculations necessary to prepare solution from pure drugs

Calculate doses for parenteral medications in liquid form and in units

Interpret the direction on drug labels and packages inserts for reconstituting medications supplied in powdered form

Describe the basic concepts and standard equipment used in administering enteral and intravenous (IV) infusion

Quickly convert flow rates between gtt/min, mL/h and mL/min

Calculate the flow rates and duration of enteral and IV infusion

Determine fluid replacement volumes

Describe intravenous medication administration

Convert from dosage rate (drug/time) to IV rate (volume/time) and vice versa

Calculate the infusion rates when medication must be added to the IVPB bag

PMT-101 Pharmaceutical Calculations

Calculate the infusion rate based on weight or BSA (size) of the patient
Calculate the flow rates for IV push medications
Calculate the duration of IVPB infusion
Determine if a pediatric dose is within the safe dose range
Calculate the pediatric oral and parenteral dosages based on weight and body surface are
Use ratio and proportion to calculate the amount of an ingredient needed to prepare a concentration of a specific ratio strength