El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA   Pharmacy Technology

COURSE RUBRIC AND NUMBER   PHRA 1347

COURSE TITLE   Pharmaceutical Mathematics II

COURSE CREDIT HOURS   3   3   0
                                                      Credits   Lec   Lab

I.   Catalog Description

Offers advanced concepts of Pharmaceutical Mathematics. A grade of "C" or better is required in this course to take the next course. **Prerequisite: PHRA 1309. (3:0).**

II.   Course Objectives

Upon satisfactory completion of this course, the student will be able to:

A.   Unit I. Basic Math and Conversion Problems
1.   Calculate drug doses using the ratio-proportion and dimensional analysis methods.
2.   Calculate the amount of medication to be dispensed.
3.   Describe the differences among the following measurement systems: apothecary, avoirdupois, metric, and common household measurements.
4.   Convert units within the metric system by moving the decimal place, using the ratio-proportion method, and using the dimensional analysis method.
5.   Identify units of household measure and convert within this system.
6.   Identify units of apothecary system of measure and convert within this system.
7.   Solve medication problems by using the household system of measure, the metric system of measure, and the apothecary system of measure.
8.   Identify equivalent apothecary and metric units and convert measurements between the two systems.
9.   Convert among the following measurement systems commonly used on prescriptions: metric, apothecary, and household.

B.   Unit II. Advanced Dosage Calculations
1.   Calculate doses of medications for children and adults using body weight.
2.   Determine Body Surface Area (BSA) using west Nomogram.
3.   Calculate Body Surface Area (BSA) using formulas.
4.   Calculate doses of medications for children and adults using body surface area (BSA).
5.   Calculate doses of medications for children using Clark's rule.
6.   Calculate doses of medications for infants using Fried's rule.
7.   Calculate doses of medications for children using Young's rule.
8.   Determine the least weighable quantity on a balance with a known accuracy and a given margin of error.
9.   Determine the amount of an aliquot in measuring diluted substances.

C.   Unit III. Calculation of Mixtures from Stock Medications (Alligations)
1.   Calculate the amount of drug in a final product that has been diluted.

Revised by Discipline: Fall 2012 (next revision in 3 years)

2. Calculate the amount of concentrate and diluent needed to make a desired concentration.
3. Calculate the amount of two products with different strengths needed to prepare a certain amount of a third product with a desired concentration.
4. Calculate the amount of a desired strength which can be made from a known amount of stock.
5. Prepare labeling for prepared medications with the date, time, and initials of the person performing the preparation.
6. Calculate the strength (percent concentration) of two or more admixed solutions.
7. Calculate the amount of active ingredient in a substance.
8. Perform calculations for altering product strength by dilution and concentration.
9. Perform calculations for the preparation and use of stock solutions.
10. Apply alligation medial and alligation alternate in problem-solving.

D.   Unit IV.   Reconstitution of Powders or Crystals into Liquid Medications
1. Read labels of powders or crystals to determine the correct diluent and the correct amount necessary to reconstitute the powders.
2. Check labels for expiration dates and storage conditions before and after reconstitution of medication to a liquid form.
3. Explain the importance of labeling the reconstituted medications with the date, time, and initials of the person performing the medication reconstitution.
4. Determinate the appropriate amount of diluent necessary when using a single-dose container of a powder.
5. Determine the appropriate amount of diluent necessary when preparing a multi-dose container of a powder.
6. Determine the appropriate dilution strength if more than one dosage strength is available in the multi-dose container and then determine the amount of diluent necessary to meet the desired strength.
7. Calculate the amount of medication that will be dispensed to meet the physician's order.
8. Determine the amount of solvent/diluent required to prepare oral and parenteral products in a desired strength.
9. Calculate the powder volume
10. Calculate the final volume.
11. Properly document reconstituted products for storage and later usage.
12. Prepare solutions for powdered drugs using directions printed on vial labels.
13. Determine expiration dates and times for reconstituted drugs.
14. Calculate dosages from reconstituted drugs.

E.   Unit V. Reducing and Enlarging Formulas
1. Perform calculations to reduce or enlarge formulas for pharmaceutical preparations stated in metric quantities.
2. Perform calculations to reduce or enlarge formulas for pharmaceutical preparations stated in proportional parts.

F.   Unit VI. Intravenous Infusions, Parenteral Admixtures, and Flow Rate Calculations
1. Measure parenteral solutions using standard syringes.
2. Explain the calibration of syringes.
3. Describe the types of IV sets by drops delivered.
4. Calculate IV drop rates and flow rates using various sets.
5. Estimate and calculate IV infusion time.
6. Calculate rates of IV infusion and IV piggyback infusion.
7. Calculate flow rate in milliliters per hour (ml/hr).
8. Calculate flow rate in milliliters per minute (ml/min)
9. Calculate flow rate in drops per minutes (gtt/min).
10. Calculate drop set in drops per milliliter (gtt/ml).

11. Calculate dosages for heparin.
12. Calculate doses of antibiotic medications measured in units.
13. Calculate insulin doses measured in units.
14. Calculate anticoagulant doses measured in units.
15. Calculate medications measured in milliequivalents.
16. Interpret dosage when the medication is expressed as a percent.
17. Calculate percentage strength of medications
18. Interpret dosage of solutions expressed in ratio strength.
19. Calculate quantities to be admixed with intravenous solutions
20. Calculate dose/weight per time

III.   THECB Learning Outcomes (WECM)

1.   Solve basic math problems and demonstrate conversion between various systems of measurement.
2.   Perform advanced dosage calculations including alligations, body surface area, formula enlargement/reduction, and IV flow rate calculations.

IV.   Evaluation

A.   Challenge Exam
Students who wish to challenge the course may contact the Instructional Dean for permission. The exam must be taken before the census cut-off date.

B.   Pre-assessment
Students' prerequisites will be reviewed during first week of class. Those who do not qualify will be directed to Admissions.

C.   Post-assessment
A continuous record of each of the student's progress will be maintained on an institutionally approved grade sheet or computerized substitute. Records will be kept in such a way that information would be clear to a second party performing an audit.

D.   Unit Exams
Written unit exams will consist of the following question types: multiple-choice, completion, essay, matching, spelling, analysis, drawing, definition, and calculations or any combination of these. The number and type of exams will be at the discretion of the instructor. Written projects will be devised and assigned throughout the semester at the instructor's discretion.

E.   Assignments
Unit Assignments are designed to assist the student in practicing Mathematic calculating procedures. Activities will be graded on a scale determined by the Instructor Syllabus. Please refer to the calendar for specific due dates.
Assignments are due at the beginning of class unless otherwise instructed. It is the student's responsibility to complete assignments as outlined in this syllabus.

F.   Final Exam
A comprehensive final exam will be administered at the end of the course.

G.   Grading Scale:

Average Grade   Letter Grade

91-100%   A
81-90.9%   B
74-80.9%   C
<74%   F
Incomplete   I
Withdrawn   W

Note: All health occupations programs require a grade of "C" or better in a course for it to be counted toward the degree plan. For this reason, no D's will be awarded.

H.   Remediation
At the instructor's discretion, students may be allowed to rewrite papers or retest for higher grades. Students requiring additional help may be referred to tutoring services.

IV.   Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

V.   6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.