EASTERN ARIZONA COLLEGE
Pharmacy Calculations
Course Design
2018-2019

Course Information

<table>
<thead>
<tr>
<th>Division</th>
<th>Allied Health</th>
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<tbody>
<tr>
<td>Course Number</td>
<td>HCE 115</td>
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<tr>
<td>Title</td>
<td>Pharmacy Calculations</td>
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<tr>
<td>Credits</td>
<td>2</td>
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<tr>
<td>Developed by</td>
<td>John Clegg</td>
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<tr>
<td>Lecture/Lab Ratio</td>
<td>2 Lecture/0 Lab</td>
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<tr>
<td>Transfer Status</td>
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<tr>
<td>Activity Course</td>
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<tr>
<td>CIP Code</td>
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<tr>
<td>Assessment Mode</td>
<td>Pre/Post Test (50 Questions/50 Points)</td>
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<td>Semester Taught</td>
<td>Fall</td>
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<tr>
<td>GE Category</td>
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<tr>
<td>Separate Lab</td>
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<td>Awareness Course</td>
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<tr>
<td>Intensive Writing Course</td>
<td>No</td>
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<tr>
<td>Diversity and Inclusion Course</td>
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Prerequisites
HCE 114 or MAT 077 or higher with a grade of "C" or higher or placement test score as established by District policy

Educational Value
This course is intended for students and community members who are interested in any Allied Health major.

Description
This course includes mathematical concepts for pharmaceutical calculations. Emphasis is on using ratios, percents, and proportions in dosage equations, applying metric measurements in ratios and proportions, preparing pharmaceutical solutions, using business math in the pharmacy, and understanding the apothecary system.

Supplies
Calculator
Competencies and Performance Standards

1. Review basic math.
   **Learning objectives**
   What you will learn as you master the competency:
   a. Change Roman numerals to Arabic numbers.
   b. Change Arabic numbers to Roman numerals.
   c. Determine the value of a decimal.
   d. Round decimals appropriately.
   e. Add and subtract fractions.
   f. Reduce fractions to lowest terms.
   g. Change fractions to decimals.
   h. Change decimals to fractions.

   **Performance Standards**
   Competence will be demonstrated:
   o on assigned activities
   o on written exams
   Performance will be satisfactory when:
   o learner responds correctly to exam questions

2. Demonstrate use of ratios, percentages, and proportions in dosage equations.
   **Learning objectives**
   What you will learn as you master the competency:
   a. Define ratio and percent.
   b. Apply ratio and proportion in problem calculations.
   c. Convert percents to fractions, decimals, and ratios.
   d. Convert fractions to percents.

   **Performance Standards**
   Competence will be demonstrated:
   o on assigned activities
   o on written exams
   Criteria - Performance will be satisfactory when:
   o learner responds correctly to exam questions

3. Apply metric measurements in ratios and proportions.
   **Learning objectives**
   What you will learn as you master the competency:
   a. Identify the basic units of the metric system.
   b. Convert metric units from larger units to smaller ones and smaller units to larger ones.
   c. Use metric measurement in pharmaceutical calculations.
   d. Set up ratio and proportion problems using metric measure.
   e. Use ratio and proportion to solve calculation problems.
f. Calculate dose based on weight.
g. Calculate dose based on body surface area (BSA).

**Performance Standards**

*Competence will be demonstrated:*

- on assigned activities
- on written exams

*Criteria - Performance will be satisfactory when:*

- learner responds correctly to exam questions

4. **Convert household and metric pharmacy measurements.**

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify units of household measure.
b. Convert between units of household measure.
c. Solve medication problems using household measure.
d. Identify approximate household measurements.
e. Convert between household measure and the metric system.
f. Convert within systems.
g. Calculate pediatric doses using a formula.

**Performance Standards**

*Competence will be demonstrated:*

- on assigned activities
- on written exams

*Criteria - Performance will be satisfactory when:*

- learner responds correctly to exam questions

5. **Prepare pharmaceutical solutions.**

**Learning objectives**

*What you will learn as you master the competency:*

a. Describe percentage as weight in weight, weight in volume, and volume in volume.
b. Use powder volume in solving solution problems.
c. Solve problems of dilution preparation.
d. Solve solution preparation problems using the allegation method.

**Performance Standards**

*Competence will be demonstrated:*

- on assigned activities
- on written exams

*Criteria - Performance will be satisfactory when:*

- learner responds correctly to exam questions
6. **Measure fluids and convert temperatures.**

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify millimoles, milliequivalents, and specific gravity.
b. Calculate problems using millimoles, milliequivalents, and specific gravity.
c. Describe units.
d. Calculate temperature conversion from Celsius to Fahrenheit and from Fahrenheit to Celsius.

**Performance Standards**

*Competence will be demonstrated:*

- on assigned activities
- on written exams

*Criteria - Performance will be satisfactory when:*

- learner responds correctly to exam questions

7. **Demonstrate proper mathematical equations to prepare drugs for intravenous administration.**

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify the major types of IV sets by drops delivered.
b. Calculate IV flow rates using various sets.
c. Demonstrate rounding-off time for IV due times.
d. Calculate rate of IV infusion.

**Performance Standards**

*Competence will be demonstrated:*

- on assigned activities
- on written exams

*Criteria - Performance will be satisfactory when:*

- learner responds correctly to exam questions

8. **Tabulate correct use of business math in the pharmacy setting.**

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify and calculate overhead cost.
b. Identify gross and net profit.
c. Calculate markup and markup rate.
d. Compute discounts.
e. Apply average wholesale price to profit calculations.
f. Calculate inventory turnover.
g. Calculate depreciation.
Performance Standards

Competence will be demonstrated:
- on assigned activities
- on written exams

Criteria - Performance will be satisfactory when:
- learner responds correctly to exam questions

9. Discuss the apothecary system.

Learning objectives

What you will learn as you master the competency:
- Identify symbols and measures of the apothecary system.
- Use the apothecary system to solve medication problems.
- Identify approximate equivalent apothecary and metric units.
- Convert measurements between the apothecary and metric systems.

Performance Standards

Competence will be demonstrated:
- on assigned activities
- on written exams

Criteria - Performance will be satisfactory when:
- learner responds correctly to exam questions

Types of Instruction

Classroom Presentation with possible WebStudy supplementation, or online only on WebStudy.

Grading Information

Grading Rationale

A pretest will be administered at the beginning of the course, which will not count as part of the final grade. The final written exam (posttest) will count as 25% of the final grade. All other written exams will count as 50% and assignments will count as 25% of the final grade.

Grading Scale

A 90-100%
B 80-89%
C 70-79%
D 60-69%
F 0-59%