SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	Mathematics in Healthcare		
CODE NO. :	PTN101	**SEMESTER:**	1
PROGRAM:	Pharmacy Technician		
AUTHOR:	Maria Coccimiglio		
DATE:	May-2013	**PREVIOUS OUTLINE DATED:**	Sept-2012
APPROVED:	"Marilyn King"		Aug. 2013
	CHAIR, HEALTH PROGRAMS		**DATE**
TOTAL CREDITS:	3		
PREREQUISITE(S):	Registration in the Pharmacy Technician Program		
HOURS/WEEK:	3		

I. COURSE DESCRIPTION:

This course emphasizes the importance of accurate pharmaceutical calculations. The learner will be introduced to dosage calculations for paediatric, adult and geriatric patients. Dilutions, calculations and conversions will be done using a variety of mathematical methods, including fractions, decimals, ratios, proportions and basic algebraic equations. Students will learn to calculate and understand mathematical terms in the different systems (metric, apothecary, international household). Other forms of measurement that will be used are the System Internationale of units and milliequivalents. Oral, parenteral and intravenous dosage calculations will also be covered.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. perform calculations accurately using ratio-proportion, fractions, stock solutions, milliequivalents, alligations, and aliquots to prepare appropriate drug quantities.

   Potential Elements of the Performance:
   - Identify the 4 types of fractions
   - Read and write fractions and decimals
   - Reduce fractions to lowest terms
   - Round decimals
   - Add, Subtract, Multiply and Divide fractions and decimals
   - Compare the values expressed by fractions and decimals
   - Interpret values expressed in ratios and percentages
   - Read and write ratios and percents
   - Calculate the percent of a quantity
   - Compare values expressed in fractions, decimals, ratios and percents
   - Convert between fractions, decimals, ratios and percentages
   - Prepare the desired solution strength from a stock solution
   - Prepare the desired strength of an ointment/cream using a more concentrated one
   - Use the aliquot method for obtaining desired quantity of active ingredient

2. interpret commonly used abbreviations, numerals and symbols used in drug orders.

   Potential Elements of the Performance:
   - Identify the symbols for roman numerals and be able to convert between Roman Numerals and Arabic numbers

3. understand the three systems of measurement used to calculate dosages and know how to convert from one system to another. Perform drug dosage calculations among these three systems of measurement using dimensional analysis.

   Potential Elements of the Performance:
   - Name the 3 systems of measurement
   - Name the 3 primary units of the metric system
   - Identify and define the prefixes used in metric system
   - Recognize abbreviations used in measurements
   - Understand and explain the use of System Internationale (SI) units and milliequivalents
   - Convert between the household, apothecary system and the metric system
   - Solve calculation problems using formulae, dimensional analysis and the ratio and proportion methods.

4. identify all pertinent information available on a manufacturer's product label.

   Potential Elements of the Performance:
   - Read and interpret product labels
   - Determine dosage strength, drug form, dosage supply or concentration
   - Identify trade and generic names, administration route, total quantity, Drug Identification Number, lot number, expiration date and bar code symbols on a drug label
   - Differentiate multidose and unit dose containers

5. interpret drug orders for the purpose of calculating and preparing the correct strength, dosage and total quantities to be dispensed for oral and parenteral medication administration.

   Potential Elements of the Performance:
   - Translate standard medical abbreviations used in writing drug orders
   - Calculate accurate dose and quantity of medication needed

6. recognize the difference between paediatric and adult doses and identify the factors involved in the calculations and preparation of dosages.

   Potential Elements of the Performance:
   - Read and interpret the calibrations of devices used in measuring oral dosages
   - Determine the body surface area (BSA) from nomogram scale or calculation formula
   - Calculate safe and appropriate dosages per BSA, per body weight and per age and determine the quantity required based on prescription dose, frequency and duration of treatment.

7. perform calculations for parenteral and intravenous medications.

   Potential Elements of the Performance:
   - Identify common IV solutions
   - Read and interpret the calibrations of devices used in measuring parenteral dosages
   - Define terminology common to IV drug order preparation
   - Calculate accurate IV flow rate, IV push rate, infusion time, infusion volume of medications
   - Calculate accurate minimum and maximum dilutions for IV medications

8. perform basic business/inventory calculations.

   Potential Elements of the Performance:
   - Calculate gross profit
   - Calculate mark-up and mark-up percentage
   - Calculate inventory turnover rates

III. TOPICS:

1. Fractions and Decimals
2. Ratios, Percents, and Proportions
3. Aliquots, Alligations, Dilutions and Stock Solutions
4. Systems of Measurement
5. Dimensional Analysis, Formula, Ratio and Proportion Dosage Calculation Methods
6. Equipment Used in Dosage Measurement
7. Interpretation of Drug Orders and Drug Labels
8. Oral Dosage of Drugs
9. Parenteral Dosage of Drugs
10. Reconstitution of Solutions
11. Paediatric and Adult Dosages Based on Body Weight
12. Intravenous Solutions, Equipment and Calculations
13. Body Surface Area and Advanced Paediatric and Adult Calculations
14. Advanced Paediatric and Adult Intravenous Calculations
15. Applied Business Math in Pharmacy

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. *Pharmacy Calculations for Technicians* (Test and Study Partner CD). (4^{th} ed.). By D.A. Ballington and T. Wiegand Green. Publisher: Paradigm. ISBN:978-0-76383-465-4

2. Sault College Learning Management System (D2L)

V. EVALUATION PROCESS/GRADING SYSTEM:

Tests (10 x 10%)	100%
Total	**100%**

1. The pass mark for the course is **80%**. The total grade is composed of marks accumulated from ten equally weighted tests.

2. All policies and procedures as outlined in the current Student Success Guide related to submitting assignments, scholarly work/academic honesty, tests and examinations will be followed.

3. **No supplements** will be provided for tests.

4. Students missing tests because of illness or other serious reason must contact the professor before the test to inform him/her (by phone or email). Those students who have notified the professor of their absence, according to policy, will be eligible to arrange an opportunity to write the test at another time. Students must contact the professor on their first day back at school following a missed test. Those students who do not follow the above procedures will receive a zero for that test. The professor reserves the right to request documentation to support an absence.

The following semester grades will be assigned to students:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	
B (Fail)	70 - 79%	3.00
C (Fail)	60 - 69%	2.00
D (Fail)	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

Mid Term grades are provided in theory classes and clinical/field placement experiences. Students are notified that the midterm grade is an interim grade and is subject to change.

Note: *For such reasons as program certification or program articulation, certain courses require minimums of greater than 50% and/or have mandatory components to achieve a passing grade.*

A minimum of a "C" grade is required to be successful in <u>most</u> PTN coded courses.

It is also important to note, that the minimum overall GPA required in order to graduate from a Sault College program remains 2.0.

VI. SPECIAL NOTES:

<u>Attendance:</u>
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.