ODESSA COLLEGE ASSOCIATE DEGREE NURSING PROGRAM
SYLLABUS RNSG 1108 / Fall 2012

COURSE TITLE: DOSAGE CALCULATIONS FOR NURSING

CREDIT: 1 HOUR

PLACEMENT: Prerequisite for program admission. Eight sections are offered every Spring and Fall semester, and three are offered Summer 1 and Summer 2. Twenty students are enrolled per section.

PRE-REQUISITES: NONE

CO-REQUISITES: NONE

LICENSING/CERTIFICATION AGENCY: TEXAS BOARD OF NURSING (BON)

FACULTY:
Mary Alice Snow MSN, RN
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COURSE DESCRIPTION: This course emphasizes critical thinking techniques to effectively, accurately and safely calculate dosages of medications. It includes reading, interpreting and solving calculation problems encountered in the preparation of medication. This course involves measurements within the apothecary, avoirdupois and metric systems. Learners will review basic math skills and learn systems of measurement. They will also learn Dimensional Analysis for calculating dosages of oral; powdered and parenteral; pediatric and adult weight–based; and, intravenous medications. Course materials are available through the printed text, the text disc and tutoring sessions scheduled throughout the semester. This course is appropriate for preparing LVN and RN learners. Due dates and times will be enforced. All materials required to complete the course will be made available the first day of class. Learners are encouraged to complete assignments early. The instructor is available for consultation and assistance via the internet, phone and scheduled tutoring times. (SCANS 3, 9)

LEARNING OUTCOMES:
The learner will:

1. Demonstrate competency in basic arithmetic function.
2. Solve problems using a critical thinking approach.
3. Demonstrate the ability to convert between the metric, apothecary, and avoirdupois systems.
4. Use Dimensional Analysis to calculate accurate dosages.
5. Demonstrate the ability to calculate dosages based on body weight of pediatric and adult patients.

COURSE OBJECTIVES: Course objectives utilize the framework of Differentiated Essential Competencies of Graduates of Texas Nursing Programs. Upon completion of the course, the student will be able to (PO=Corresponding Program Outcome):

As a Provider of Patient-Centered Care:

1. Demonstrate competency in basic arithmetic functions.
2. Solve problems using a critical thinking approach (PO 3, 7).
3. Accurately use and convert between Metric, Apothecary, and Avoirdupois (household) systems; and, be able to convert within each system (PO 3).
4. Read dosage and medication information using accepted terminology and abbreviations.
5. Interpret medication orders.
6. Calculate dosages using basic systems of measurement.
7. Demonstrate knowledge of safe accurate medication calculation using Dimensional Analysis.
8. Utilize the information on medication labels to calculate prescribed dosages.
9. Calculate pediatric and adult medication dosages based on weight.
10. Calculate intravenous solution flow rates for elective and manual infusion systems.

TEACHING/LEARNING METHODS: The following methods may be incorporated into RNSG 1108:

1. Online instructional methodology
2. Examinations
3. Tutoring

**This course has been identified by Career, Technical, and Workforce Education as one in which teaching and learning strategies adopted by AVID will be implemented. As a student, you will be expected to develop an understanding of the strategies, to model the strategies, to maintain fidelity of implementation, and to examine how these strategies may impact your effectiveness as a professional in your chosen area of occupation, either through coursework or practicum experience as outlined by the course instructor.

EVALUATION AND GRADING:

Quizzes	25%
Participation	5%
Midterm	35%
Final exam	35%
TOTAL	100%

GRADING SCALE:

A = 90-100
B = 80-89
C = 75-79
D = 60-74.99
F = 59 & Below

A final grade of C or higher must be attained in order to pass RNSG 1108. No grades will be rounded up to 75 to pass (Example: 74.99 = grade of D)

**The Odessa College Student Success Coaches will help you stay focused and on track to complete your educational goals. If an instructor sees that you might need additional help or success coaching, he or she may submit a Retention Alert or a Starfish Alert. A Student Success Coach will contact you to work toward a solution.

REQUIRED TEXTBOOKS:
Curren, A. M. (2010). *Dimensional analysis for meds*. (4th ed.). New York: Delmar.

COURSE MATERIALS:
Dimensional Analysis for Meds (Fourth Edition) textbook
Student Practice Software disc located in the back of the book
Internet

COURSE POLICIES:

1. Dates and times for participation assignment(s)/quizzes/exams will be announced under the "Tasks" tab on Blackboard. All testing is "online" except for the final exam which must be handwritten on campus. The quizzes and midterm exam are provided under "Assignments" tab on Blackboard. The midterm exam and final exam each count as 35% of the course grade. Failure to turn in a quiz or midterm at the proper time will result in a 10% grade reduction for each day the assignment is late.
2. Quizzes are provided in order to encourage practice and precision. They are weighted 25% of the course grade. The quizzes are provided under "Assignments" tab on Blackboard. Quizzes 1-5 are due per assigned dates. As stated above, failure to turn in a quiz at the proper time will result in a 10% grade reduction for each day the quiz is late.
3. You must show all your work in order to get full credit for each quiz.
4. **You must mail, email (as an attachment), or fax your quizzes and midterm. An assignment submitted by any means other than mail, email or fax WILL NOT be accepted.** Quizzes faxed will be to the attention of Ms. Snow and faxed to the OC Associate Degree Nursing Department @ (432) 335-6873.
5. You may reach the instructor by telephone (432) 935-4712 or at msnow@odessa.edu to discuss specific problems, assignments or other issues. The instructor will be available for tutoring on campus by appointment only.

ATTENDANCE POLICY: No campus attendance is required, except for the final exam. Each student will be required to show a picture ID prior to taking the final exam.

ABSENCE FROM EXAMS: It is your responsibility to arrange to complete all quizzes and the midterm; and, to complete the course on time.

EXPECTATIONS FOR ENGAGEMENT – ONLINE LEARNING:

To help make the web-based learning experience fulfilling and rewarding, the following Expectations for Engagement provide the parameters for reasonable engagement between students and instructors for the online learning environment. Students and instructors are welcome to exceed these requirements.

Reasonable Expectations of Engagement for Instructors

1. As an instructor, I understand the importance of clear, timely communication with my students. In order to maintain sufficient communication, I will:

- provide my contact information at the beginning of the syllabus;
- respond to all messages within 24 hours if received Monday through Thursday and within 48 hours if received Friday through Sunday; and,
- notify students of any extended times that I will be unavailable and provide them with alternative contact information (for me or for my supervisor) in case of emergencies during the time I'm unavailable.

2. As an instructor, I understand that my students will work to the best of their abilities to fulfill the course requirements. In order to help them in this area, I will:

- provide clear information about grading policies and assignment requirements in the course syllabus, and
- communicate any changes to assignments and/or to the course calendar to students as quickly as possible.

3. As an instructor, I understand that I need to provide regular, timely feedback to students about their performance in the course. To keep students informed about their progress, I will:

- post grades for discussion postings within one week of the discussion thread closing.
- provide grades for major assignments within 2 weeks of the due date or at least 3 days before the next major assignment is due, whichever comes first.

Reasonable Expectations of Engagement for Students

1. As a student, I understand that I am responsible for keeping up with the course. To help with this, I will:

- line up alternative computer and internet access in case my primary computer crashes or my internet services are unavailable;
- recognize that the college provides free Wi-Fi and computer labs during regular campus hours to help me with accessing my course; and,
- understand that my instructor does not have to accept my technical issues as a legitimate reason for late or missing work if my equipment or service is unreliable.

2. As a student, I understand that it is my responsibility to communicate quickly with the instructor any issue or emergency that will impact my involvement with or performance in the class. This includes, but is not limited to:

- getting "kicked off" of the system during tests or quizzes;
- having trouble submitting assignments; and
- dealing with a traumatic personal event.

3. As a student, I understand that it is my responsibility to understand course material and requirements and to keep up with the course calendar. While my instructor is available for help and clarification, I will:

• seek out help from my instructor and/or from tutors;
• ask questions if I don't understand; and,
• access my course several times during the week to keep up with assignments and announcements.

UNIT OUTLINE: Section 1: Refresher Math
Section 2: Introduction to Drug Measures
Section 3: Reading Medication Labels and Syringe Calibrations
Section 4: Dosage Calculation

Section 5: Dosage Calculation from Body Weight and Body Surface area
Section 6: Intravenous Calculations
Section 7: Pediatric Medication Calculations

SECTION OBJECTIVES: (CO= Corresponding Course Objective)

Section 1: Refresher Math
(*Review only – Will not be tested*)

Chapter 1: Relative Value, Addition, and Subtraction of Decimals (CO 1)

Chapter 2: Multiplication and Division of Decimals (CO 1)

Chapter 3: Solving Common Fraction Equations (CO 1)

Section 2: Introduction to Drug Measures
(*Review and Testing on Chapters 4 & 5 ~ QUIZ 1*)

Chapter 4: Metric/International (SI) System (CO 1-4)

The learner will:
1. List the commonly used units of measure in the metric system
2. Express metric weights and volumes using correct notation rules
3. Convert metric weights and volumes within the system

Chapter 5: Unit, Percentage, Milliequivalent, Ratio, Household, and Apothecary Measures (CO 1-4)

The learner will recognize dosages:
1. Measured in units
2. Measured as percentages
3. Using ratio strengths
4. Measured in milliequivalents
5. In household measures
6. In apothecary measures

Section 3: Reading Medication Labels and Syringe Calibrations

(*Review only of Chapter 7 – Review and Testing on Chapters 6, 8-11 ~ QUIZ 2)*

Chapter 6: Oral Medication Labels and Dosage Calculation (CO 1-5)

The learner will:

1. Identify scored tablets, unscored tablets, and capsules
2. Read drug labels to identify trade and generic names
3. Locate dosage strengths and calculate average dosages
4. Measure oral solutions using a medicine cup

Chapter 7: Safe Medication Administration

Chapter 8: Hypodermic Syringe Measurement (CO 1-7)

The learner will measure parenteral solutions using:

1. A standard 3 mL syringe
2. A tuberculin (TB) syringe
3. 5 and 10 mL syringes
4. A 20 mL syringe

Chapter 9: Parenteral Medication Labels and Dosage Calculation (C 1-8)

The learner will:

1. Read parenteral solution labels and identify dosage strengths
2. Calculate average parenteral dosages from the labels provided
3. Measure parenteral dosages in metric, milliequivalent, unit, percentage, and ratio strengths using 3 mL, TB, percentage, 10 and 20 mL syringes

Chapter 10: Reconstitution of Powdered Drugs (CO 1-8)

The learner will:

1. Prepare solutions from powdered drugs using directions printed on vial labels
2. Prepare solutions from powdered drugs using drug literature or inserts
3. Determine expiration dates and times for reconstituted drugs
4. Calculate simple dosages for reconstituted drugs

Chapter 11: Measuring Insulin Dosages (CO 1-8)

The learner will:

1. Identify different types of insulin currently in use
2. Discuss the difference between rapid-, short-, intermediate- and long-acting insulin
3. Read insulin labels to identify type
4. Read calibrations on 100 units/mL insulin syringes
5. Measure single insulin dosages
6. Measure combined insulin dosages

Section 4: Dosage Calculations
(Review and Testing on Chapter 12 ~ QUIZ 3)

Chapter 12: Dimensional Analysis/Units Conversion (CO 1-8)

The learner will use dimensional analysis to calculate dosages.

Section 5: Dosage Calculation from Body Weight and Body Surface Area
(Review and Testing on Chapter 13 ~ QUIZ 4) (Review only of Chapter 14)

Chapter 13: Adult and Pediatric Dosages Based on Body Weight (CO 1-9)

The learner will:

1. Convert body weight from lb to kg and from kg to lb
2. Calculate dosages using mcg or mg / kg or lb
3. Determine if dosages ordered are within the normal range

Chapter 14: Adult and Pediatric Dosages Based on Body Surface Area [BSA]

Section 6: Intravenous Calculations
(Review only of Chapters 15 & 19)
(Review and Testing on Chapters 16-18 ~ QUIZ 5)

Chapter 15: Introduction to IV Therapy

Chapter 16: IV Flow Rate Calculation (CO 1-10)

The learner will:

1. Identify IV calibrations in gtt/ml
2. Calculate flow rates using dimensional analysis
3. Recalculate flow rates to correct off-schedule infusions

Chapter 17: Calculating IV Infusion and Completion Times (CO 1-10)

The learner will calculate:

1. Infusion times
2. Completion times using international, military and standard time
3. Infusion time to label IV bag/bottle with start, progress and completion times

Chapter 18: IV Medication and Titration Calculations (CO 1-10)

The learner will calculate:

1. Flow rates to infuse ordered dosages
2. Dosages and flow rates based on kilogram (kg) body weight
3. Dosage and flow rate ranges for titrated medications

Chapter 19: Heparin Infusion Calculations

Section 7: Pediatric Medication Calculations

(Review only - Will not be tested)

Chapter 20: Pediatric Oral and Parenteral Medications

Chapter 21: Pediatric Intravenous Medications

Use the following instructions to answer questions in the quizzes:

Military Time Explained: Your book does not explain military time so I am including this summery to explain how military time is calculated. All hospitals, pharmacies, clinics, etc. use this way of marking time since it is less confusing and more accurate.

Military time works on a 24 hour clock instead of 2, 12 hour periods. It is a more accurate way of communicating time to other people (either verbally or in writing) and is the reason it is used in medicine. All numbers after noon continue to rise rather than go back to start at 1 again. Thus, 1 p.m. is 1300 in military time and 2 p.m. is 1400. Likewise, one minute before midnight would be 2359. One minute after midnight would be 0001. Any time in the a.m. will begin with a "0" to make it most clear. Thus 2 a.m. becomes 0200 (pronounced "oh two hundred"), 6 a.m. is 0600 (pronounced "oh six hundred").

Dimensional analysis is a systematic method of problem solving that avoids the use of formulas. It is much easier to learn one method that works for all problem solving. It requires a working knowledge of conversion factors and equivalencies. Equivalents are factors that are equal to each other. For example: [3 ft = 1 yard] is an equivalent or has the same value. Flipping the equation [1 yard = 3 ft] does not change its value. The same is true with [36 inches = 1 yard] and [1 yard = 36 inches]. Conversion factors are equivalents that are necessary for moving between the different systems of measurement [apothecary, metric, and household].

Steps for using Dimensional Analysis:

1. Carefully read the problem. Determine the GIVEN QUANTITY (which is given to you in the problem).
2. Determine DESIRED QUANTITY (answer) unit of measure (ml, mg, minutes, etc.).
3. Determine what CONVERSION FACTORS you will need to use. Some may be given to you in the problem (like how many mg/ml) while others we expect you to know (for example, how many cc's in a teaspoon).
4. SET UP: Dimensional analysis problems are set up like fractions, with a numerator (top number/s) and a denominator (bottom number/s). Set up the problem so that the unwanted units are canceled out. If you are given mg on top, and you really want the answer in mL, you would set up the problem using mL to mg conversion (given in the problem) and place mg on the bottom, so mg will cancel out. [I know this doesn't make sense but hang in there, it gets easier as you work the problems.]
5. Cross out the units that cancel out, leaving nothing but the desired quantity.

6. Do the basic math. Solve the problem by using basic math (no algebra needed). Multiply the numbers across. Divide the top number by the bottom number. You now have the correct answer!

Sample Problem: *Ordered: Ceclor 500 mg
*Wanted Quantity: _____ mL
*Conversion Factor: 400 mg / 5 mL (given in the problem)
*Set up:

$$\frac{5 \text{ mL}}{400 \text{ mg}} = \frac{500 \text{ mg}}{1 \text{ dose}}$$

*Do the basic math:
Multiply the numbers across, then divide the number on top by the number on bottom

$$(500 \times 5) \div 400 = 6.25 \text{ mL}$$

COURSE CALENDAR: This is a "paced" online course. In other words, students will not be allowed to complete this course prior to the end of the semester. Deadlines and due dates are available on Blackboard.

****The SEI process for face-to-face and online courses is scheduled for the week of November 26th.**

**Odessa College complies with Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. If you have any special needs or issues pertaining to your access to and participation in this or any other class at Odessa College, please contact Becky Rivera-Weiss in the Office of Disability Services at 432-335-6861 to request assistance and accommodations.