Syllabus: RNSG-1108 - Dosage Calculations for Nursing-M1

Associate Degree Nursing Department

RNSG 1108

Dosage Calculation for Nursing
Prepared by:

B. Howard, RN, MSN, Course coordinator

Spring 2007

Alvin Community College Associate Degree Nursing

Dosage Calculation for Nursing RNSG 1108

Spring, 2007

Course Calendar

Note: Schedule may be adjusted by faculty as needed - Students will be notified

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>01/11/07</td>
<td>Classes begin</td>
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<tr>
<td>01/18/07</td>
<td>Academic Honesty Survey due</td>
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<tr>
<td>01/22/07</td>
<td>Syllabus Quiz due</td>
</tr>
<tr>
<td>01/25/07</td>
<td>Test One due</td>
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<tr>
<td>01/29/07</td>
<td>Last day to drop without a grade</td>
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<tr>
<td>02/08/07</td>
<td>Test Two due</td>
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<td>03/08/07</td>
<td>Test Three due</td>
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<tr>
<td>03/12-16/07</td>
<td>Spring Break</td>
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<tr>
<td>04/04/07</td>
<td>Test Four due</td>
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<tr>
<td>Date</td>
<td>Event</td>
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<tr>
<td>04/06-09/07</td>
<td>Spring Holiday</td>
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<tr>
<td>04/10/07</td>
<td>Last day to drop</td>
</tr>
<tr>
<td>04/26/07</td>
<td>Test Five due</td>
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<tr>
<td>05/01/07</td>
<td>Final Exam due</td>
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interpreting and solving calculation problems encountered in the preparation of medications; and
conversion of measurements within the apothecary, avoirdupois, and metric system. This course
emphasizes critical thinking skills and techniques needed to accurately and safely calculate
medication dosages. (1 lecture hours per week for 16 weeks).

**Learning Outcomes:** Solve problems using a critical thinking approach and convert between the
metric, apothecary, and avoirdupois systems.

**Prerequisite:** THEA obligation for mathematics met.

**Corequisites:** None

**Note:** Enrollment in or completion of this course does NOT constitute acceptance into the
associate degree nursing program.

**Instructor**

Beverly Howard

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**REQUIRED TEXTBOOKS**

**COURSE OBJECTIVES**

The following objectives are based on the Differentiated Entry Level Competencies (DELC) identified by the Texas State Board of Nurse Examiners and the Secretary’s Commission on Achieving Necessary Skills (SCANS). Upon completion of Dosage Calculation for Nursing RNSG 1108 the student should:

**Role: Provider of Care**

1. Determine the health status and health needs of the individual and family based upon interpretation of health data and preventive health practices in collaboration with the individual and family and interdisciplinary health care team members.
   a. Medical diagnoses, pharmacotherapeutics and other therapies and treatments.
2. Implement plan of care within legal and ethical parameters, including scope of practice, in collaboration with the individual and family in meeting health care needs.
   a. Principles and rationale underlying the use, administration, and interaction of pharmacotherapeutic agents, including intravenous medications.
   b. Nursing procedures and skills to implement plan of care.
   c. Decision-making, problem-solving, and critical thinking processes.
   d. Perform therapeutic and preventive nursing measures and administer treatments and medications as authorized by law and determined by the BNE.
   e. Evaluate, document, and report responses to medications, treatments, and procedures and communicate the same to other health care professionals clearly and accurately.

**Role: Coordinator of Care**
3. Coordinate human and material resources for the provision of care.
   a. Principles of organizing and managing resources.
   b. Principles of management, decision making, assertiveness, communication, motivation, time management, delegation, and principles of change.
   c. Current systems for managing individual and family information.
4. Function within the organizational framework of various health care settings.
   a. RN’s role in risk management.
   b. Basic principles of management and communication within an organization.
   c. Relationships among members of the interdisciplinary health care team.

Role: Member of a Profession

1. Assume accountability and responsibility for the quality of nursing care provided to individuals and families.
   a. Standards of nursing practice and care.
   b. Legal parameters of nursing practice including the Texas Nursing Practice Act.
   c. Issues affecting the RN role and the delivery of individual and family care.
2. Act as an advocate to promote the provision of quality health care for individuals and families.
   a. Current issues and legal principles relating to safeguarding individual and family rights.
   b. Role of the nurse as individual and family advocate.
   c. Role/responsibility for public safety and welfare.

SCANS

The Secretary’s Commission on Achieving Necessary Skills (SCANS) was developed by the U.S. Department of Labor. These are the foundation skills and workplace competencies required in today’s workplace. Within the Associate Degree Nursing Program, these skills will be incorporated throughout the curriculum.

COMPETENCIES
C1. **Allocates Time** - Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules.

C2. **Allocates Money** - Uses or prepares budgets, including making cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments.

C3. **Allocates Material and Facility Resources** - Acquires, stores, and distributes materials, supplies, parts, equipment, space, or final products in order to make the best use of them.

C4. **Allocates Human Resources** - Assesses knowledge and skills and distributes work accordingly, evaluates performance and provides feedback.

**Information**

C5. **Acquires and Evaluates Information** - Identifies need for data, obtains them from existing sources or creates them, and evaluates their relevance and accuracy.

C6. **Organizes and Maintains Information** - Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion.

C7. **Interprets and Communicates Information** - Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multi-media methods.

C8. **Uses Computers to Process Information** - Employs computers to acquire, organize, analyze, and communicate information.

**Interpersonal**

C9. **Participates as a Member of a Team** - works cooperatively with others and contributes to group with ideas, suggestions, and effort.

C10. **Teaches Others** - Helps others learn.

C11. **Serves Clients/Customers** - Works and communicates with clients and customers to satisfy their expectations.
C12. Exercises Leadership - Communicates thoughts, feelings, and ideas to justify a position; and encourages, persuades, convinces, or otherwise motivates an individual or group, including responsibility challenging existing procedures policies, or authority.

C13. Negotiates - Works towards an agreement that may involve exchanging specific resources or resolving divergent interests.

C14. Works with Cultural Diversity - Works well with men and women, and with a variety of ethnic, social, or educational backgrounds.

Systems

C15. Understands Systems - Knows how social, organizational, and technological systems work and operates effectively within them.

C16. Monitors and Corrects Performance - Distinguishes trends, predicts impact of actions on system operations, diagnoses deviations in the function of a system/organization, and takes necessary action to correct performance.

C17. Improves and Designs Systems - Makes suggestions to modify existing systems to improve products or services, and develops new or alternative systems.

Technology

C18. Selects Technology - Judges which set of procedures, tools, or machines, including computers and their programs, will produce the desired results.

C19. Applies Technology to Tasks - Understands the overall intent and the proper procedures for setting up and operating machines, including computers and their programming systems.

C20. Maintains and Troubleshoots Technology - Prevents, identifies, or solves problems in machines, computers, and other technologies.

Foundation Skills

Basic Skills
F1  Reading
F2  Writing
F3  Arithmetic
F4  Mathematics
F5  Listening
F6  Speaking

Thinking Skills

F7  Creative Thinking
F8  Decision Making
F9  Problem Solving
F10  Seeing Things in the Mind’s Eye
F11  Knowing How to Learn
F12  Reasoning

Personal Qualities

F13  Responsibility
F14  Self-Esteem
F15  Social
F16  Self-Management
F17  Integrity/Honesty
METHODS OF INSTRUCTION

This is one of the first nursing courses and provides the foundation of medication calculations upon which the other nursing courses are built. The student is introduced to the basic arithmetic needed to apply to drug dosage calculations. The goal is to educate the student in strategies for calculating drug dosages for accuracy and safety in administration of medication. The classroom portion of the course will be conducted as lecture/discussion and problem solving sessions. The student is expected to come to class prepared, having read the assigned materials, and reviewed WebCT materials as assigned.

This course is a co-requisite for RNSG 1513 and RNSG 1260. Any student who is unsuccessful in RNSG 1108 must retake the course prior to progressing in the nursing program.

EVALUATION

<table>
<thead>
<tr>
<th>POINTS</th>
<th>EVALUATIVE METHOD</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>250</td>
<td>Five unit exams each worth 50 points</td>
<td>Each exam contains 20 application problems involving dosage calculations. If a student receives a grade below 75% on any exam, he/she must schedule a counseling appointment with the instructor.</td>
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<tr>
<td>250</td>
<td>Final Exam</td>
<td>Comprehensive 20 question calculation exam given on the day designated by the college for the final exam.</td>
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<tr>
<td>500</td>
<td>Total Exam Points</td>
<td>A minimum of 375 (75%) exam points are needed to receive a “C” or better in this course.</td>
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* The student needs to achieve a minimum of 375 points out of the 500 examination points on his/her tests in order to receive a grade of “C” or better in the course. If 375 points are not earned, the student receives a course grade of “D” or “F” and is ineligible to progress in the Associate Degree Nursing Program.

The course grading scale is:
A=     500-450 pts     (90-100%)

B=     400-449 pts     (80-89%)

C=     375-399 pts     (75-79%)

D=     300-374 pts     (60-74%) (No grade below "C" (75) is acceptable for progression in nursing.)

F=     299 and below (0-59%)

Exams:

Material to be covered on exams reflects an increasing need to critically think regarding client care activities. Unit objectives from the syllabus provide a blueprint and study guide for testing. Each unit exam is 20 items and consists of application problems involving calculations. One hour is allotted for all exams. Exams will be administered via computer/WebCT.

Note: Grades will be available on WebCT two (business) days following the exam. After one calendar week, all quiz and exam grades will be non-negotiable and will remain as recorded.

WebACCess is the official grade reporting mechanism at Alvin Community College. All grades in WebCT are unofficial until verified in WebACCess.

OTHER COURSE POLICIES
BEHAVIOR

Whenever the student is in the classroom (electronic or face to face), a clinical agency, on a field trip, at an off-campus activity or attending a convention, he/she is a representative of Alvin Community College and is expected to behave in an appropriate manner. The Code of Student Conduct from the ACC Student Handbook is in effect for all nursing related activities. Disciplinary action will be taken against any student who violates the code.

Additionally, the Associate Degree Nursing Program follows and enforces the ACC Code of Academic Integrity and Honesty located in the ACC Student Handbook.

OTHER COURSE POLICIES:

ADA STATEMENT: This college will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the policy of ACC to provide reasonable accommodations for qualified individuals who are students with disabilities. It is the student’s responsibility to contact the Counseling Center in a timely manner to arrange for appropriate accommodations.

The student should refer to the ACC/ADN Student Handbook for a full explanation of policies that are followed in this course.

UNIT OBJECTIVES

Unit One
Review of Basic Math (F1 – 6, 8 – 9, 13, 16 – 17: C1, 5, 7, 9, 10, 18 – 20)

I. Roman Numerals
   A. Change Roman numerals to Arabic numbers.
   B. Change Arabic numbers to Roman numerals.

II. Fractions
   A. Compare the size of fractions.
   B. Add and subtract fractions.
   C. Multiply and divide fractions.
   D. Reduce fractions to lowest terms.

III. Decimals
   A. Read and write decimals.
   B. Compare the size of decimals.
   C. Change fractions to decimals and decimals to fractions.
   D. Add, subtract, multiply, and divide decimals.
   E. Round off decimals appropriately.

Systems of Measurement (F1 – 6, 8 – 9, 13, 16 – 17: C1, 5, 7, 9, 10, 18 – 20)
IV. Metric System

A. Express metric measures correctly using rules of the metric system.

B. State from memory common equivalents in the metric system that are used for medication administration.

C. Convert metric measures to their equivalents in metric.

V. Apothecaries’ System

A. State the common apothecaries’ and household equivalents.

B. State the specific rules that relate to the apothecaries’ and household systems.

C. Identify symbols and interpret measures in the apothecaries’ and household systems.

Dimensional Analysis Calculation Method (F1 – 6, 8 – 9, 13, 16 – 17: C1, 5, 7, 9, 10, 18 – 20)

VI. State dimensional analysis techniques to solve a given calculation problem.

A. Set up application problems using the dimensional analysis method.

B. Solve application problems using the dimensional analysis method.

Learning Opportunities

Curren, Sections 1, 2, and 4
Syllabus

Learning Activities

Classroom activity: Work exemplary problems on the board

WebCT instruction modules and practice problems

Unit Two

Converting Within and Between Systems

VII. Recall equivalents/conversions from metric, apothecaries’, and household systems to convert a given measure.

A. Convert a unit of measure to its equivalent within the same system.

B. Convert a unit of measure to its equivalent in another system of measure (for example, metric to apothecaries’).

C. Use common conversions to solve application problems.

Learning Opportunities

Curren, Section 2

Learning Activities

Classroom activity: Work exemplary problems on the board

WebCT instruction modules and practice problems
Unit Three

Medication Administration Calculations (F1 – 6, 8 – 9, 13, 16 – 17: C1, 5, 7, 9, 10, 18 – 20)

VIII. Reading Medication Labels

A. Identify the trade and generic names of medications.

B. Identify the dosage strength of medications.

C. Identify the concentration strength where indicated.

D. Identify the form in which a medication is supplied.

E. Identify the total volume of a medication container where indicated.

F. Identify directions for mixing or preparing a drug where necessary.

IX. Oral Medications

A. Identify the forms of oral medication.

B. Identify the terms on the medication.

C. Calculate doses for oral and liquid medications using the dimensional analysis method.

D. Apply principles learned concerning tablet and liquid preparations to obtain a rational answer.
X. Parenteral Medications

A. Identify the various types of syringes used for parenteral administration.

B. Read and measure doses on a syringe.

C. Read medication labels on parenteral medications.

D. Identify concentration of parenteral medications already in solution.

E. State the meaning of a given percent solution.

F. Calculate doses of parenteral medications already in solution.

G. Identify appropriate syringes to administer doses calculated.

XI. Reconstitution of Powdered drugs

A. Prepare a solution from a powdered medication according to directions on the vial or other resources.

B. Identify essential information to be placed on the vial of a medication after it is reconstituted.

C. Determine the best concentration strength for medications ordered, when there are several directions for mixing.

D. Calculate doses from reconstituted medications.

XII. Insulin

A. Identify important information on insulin labels.

B. Read calibrations on U-100 insulin syringes.

C. Measure insulin in single doses.

D. Measure combined insulin doses.
E. Convert insulin units to milliliters.

Learning Opportunities

Curren, Section 3

Learning Activities

Classroom activity: Work exemplary problems on the board

WebCT instruction modules and practice problems

Unit Four

XIII. Calculating Dosages based on Body Weight and Body Surface Area

A. Calculate minimum and maximum recommended dosages based on body weight.

B. Calculate dosages using body surface area (BSA).

Learning Opportunities

Curren, Section 5

Learning Activities

Classroom activity: Work exemplary problems on the board

WebCT instruction modules and practice problems
Unit Five

XIII. Calculation of basic intravenous therapy.

A. Differentiate between primary and secondary administration sets.

B. Identify the abbreviations used for I.V. fluids.

C. Identify from the I.V. tubing packages the drop factor in gtt/mL.

D. Calculate drip rates using the dimensional analysis method.

E. Calculate flow rates using the dimensional analysis method.

F. Calculate infusion times.

G. Determine infusion completion times.

H. Calculate the flow rate/drip rate for medications ordered I.V. over a specified time period.

I. Calculate flow rate from dosage ordered.

J. Calculate dosage infusing from flow rate.

K. Titrate infusions.

XIV. Heparin Administration

A. State the importance of calculating heparin doses.

B. Calculate units/hr infusing from flow rate.

C. Calculate flow rate from units/hr ordered.
Learning Opportunities

Curren, Section 6

Learning Activities

Classroom activity: Work exemplary problems on the board

WebCT instruction modules and practice problems