



VNSG 1227-501CL
Essentials of Medication Administration
Spring 2025
Monday 1:00 PM – 4:15 PM
Steam bldg. Rm 237

Instructor Information:

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409-933-8395

Student hours and location: Tuesdays and Wednesdays 0900-1600. Other days/time by Appointment.

Required Textbook/Materials: Elsevier 360 electronic book bundle.

Mulholland, J.M., & Turner, S.J. (2023). *The nurse, the math, the meds: Drug calculations using Dimensional analysis* (5th ed.). St. Louis, MO: Elsevier/Mosby.

Course Description: VNSG 1227. Medication Administration. This course covers the general principles of medication administration including determination of dosage, preparation, safe administration and documentation of multiple forms of drugs. Instruction includes various systems of measurement. (Credit hours: Lecture 1, Lab 2) (16-week course, 48 contact hours).

Course requirements:

1. **Unit exams (3):** Assess knowledge and application of incremental course content. The nursing curriculum is meant to build on knowledge learned in prior semesters. Exam content may include questions related to any previously learned content from prior courses. If a student receives a grade below 75% on any exam, he/she should schedule a counseling appointment with the instructor. Remediation will be required before moving on to the next exam.
2. **Comprehensive Final Exam (1):** Assesses overall knowledge and application of complete course content.
3. **EAQ Quizzes (4):** Assesses knowledge and application of content integrated within the course. The student will have one attempt to complete each EAQ quiz. Students must complete each required quiz by the due date and time. Failure to submit a quiz by the due date and time will result in a grade of zero (0) for that quiz. The average of all assigned quizzes will be calculated for the final EAQ quiz grade.
4. **Sherpath Lessons (4):** Assesses knowledge and application of selected content within the course. Students must complete each required lesson by the due date and time. Failure to submit a lesson by the due date and time will result in a grade of zero (0) for that lesson. The average of all assigned lessons will be calculated for the final Sherpath Lesson grade.

5. **Remediation:** All students scoring < 75% on Unit Exams will be required to remediate by the date and time chosen by faculty and is the “ticket” to sit for the next exam. Failure to successfully remediate with all steps completed by the due date and time will prevent the student from taking the next exam and a zero will be entered for the next exam grade

Determination of Course Grade/Detailed Grading Formula:

All assignments, including pass/fail, must be submitted to pass the course. The exam average must be at least 75% before non-examination assignment grades are calculated into the final course grade. See Grade Determination & Calculation in the Nursing Student Handbook.

Computation of Grades		%
Exam 1*		16.6
Exam 2*		16.7
Exam 3*		16.7
Final Exam*		10
Subtotal 75% Rule		
Exam Total*		60
EAQ Quiz Average (5% each) **		20
Sherpath Lesson Average (5 % each) **		20
Assignment Total**		40
Course Total		100
* ≥ 75% exam average required to pass the course		
**Weighted assignments calculated only after 75% exam average met		

Grading Scale

A = 90 - 100.00

B = 80 - 89.99

C = 75 - 79.99*

D = 60 - 74.99 F = < 60

***A minimum final grade of “C” is required to pass this course.**

Late Work, Make-Up, and Extra-Credit Policy:

All course assignments are expected to be completed and submitted on the specified due date. There are no make-up or extra credit opportunities. See Late Assignment Policy in the Nursing Student Handbook

Attendance Policy:

An absence is defined as missing half or more of a class period. Three or more absences in nursing theory courses will result in written counseling. An instructor-initiated withdrawal may occur if a student continues to be absent after the counseling is given. See Attendance Policy in the Nursing Student Handbook.

Communicating with your instructor: ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means. Students should check this email daily.

Course Objectives/Student Learning Outcomes:

Student Learner Outcome	Maps to Core Objectives	Assessed via this assignment
1. List the common units of measurement in the metric system using correct notation.	Lecture, Discussion, Audiovisual Aids, Critical Thinking Exercises, Simulations, Computer-Assisted Instruction, Case Scenarios, Medication Administration Skills, Educational Games	EAQ, Skills Demonstration, Exams
2. Demonstrate proper use of nursing/med abbreviations.		
3. List the common units of measure in the metric and household systems plus their symbols and abbreviations.		

4. Make conversions between metric and household measurements.		
5. Safely read drug labels to identify trade and generic names, dosages, and mixing instructions.		
6. Use dimensional analysis to convert metric weights, volumes and calculate dosages.		
7. Describe the correct technique for administering the medications via various routes.		

Academic Dishonesty:

Any incidence of academic dishonesty will be dealt with in accordance with college policy and the Student Handbook. Academic dishonesty, such as cheating on exams, is an extremely serious offense. See Behavior/Conduct policy in the Nursing Student Handbook.

Student Concerns: If you have any questions or concerns about any aspect of this course, please contact me using the contact information previously provided. If, after discussing your concern with me, you continue to have questions, please contact the VN Program Coordinator Jalayne Henderson at jhenderson11@com.edu.

Plagiarism: Plagiarism is using someone else’s words or ideas and claiming them as your own. Plagiarism is a very serious offense. Plagiarism includes paraphrasing someone else’s words without giving proper citation, copying directly from a website, and pasting it into your paper, using someone else’s words without quotation marks. Any assignment containing any plagiarized material will receive a **grade of zero** and the student will be referred to the Office of Student Conduct for appropriate disciplinary action. Also see the Behavior/Conduct policy in the Nursing Student Handbook.

Classroom Conduct Policy/Student Conduct:

Classroom Conduct Policy: College of the Mainland requires that students enrolled at COM be familiar with the Standards of Student Conduct, which can be found in the on-line Student Handbook. Students should always act in a professional manner. Disruptive students will be held accountable according to college policy. Any violations of the Code of Conduct will result in a referral to the Office for student Conduct and may result in dismissal from this class.

Course outline: See in D2L – course calendar

Institutional Policies and Guidelines

Grade Appeal Process: Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook <https://www.com.edu/student-services/docs/Student Handbook 2024-2025 v2.pdf>

An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the student's work and performance is also not an admissible basis for a grade appeal.

Academic Success & Support Services: College of the Mainland is committed to providing students the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

ADA Statement: Any student with a documented disability needing academic accommodation is requested to contact:

Kimberly Lachney, Student Accessibility Services Coordinator

Phone: 409-933-8919

Email: AccessibilityServices@com.edu

Location: COM Doyle Family Administration Building, Student Success Center

Textbook Purchasing Statement: A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Withdrawal Policy: Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1st 8-week session is February 26. The last date to withdraw from the 16-week session is April 21. The last date to withdraw for the 2nd 8-week session is May 1. The last date to withdraw for spring mini session is April 30.

FN Grading: The FN grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The FN grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the FN grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an FN grade.

Early Alert Program: The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been asked to refer students to the program throughout the semester if they are having difficulty completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer in order for you to meet your academic goals.

Resources to Help with Stress:

If you are experiencing stress or anxiety about your daily living needs including food, housing or just feel you could benefit from free resources to help you through a difficult time, please click here <https://www.com.edu/community-resource-center/>. College of the Mainland has partnered with free community resources to help you stay on track with your schoolwork, by addressing life issues that get in the way of doing your best in school. All services are private and confidential. You may also contact the Dean of Students office at deanofstudents@com.edu or communityresources@com.edu.

Nondiscrimination Statement: The College District prohibits discrimination, including harassment against any individual on the basis of race, color, religion, national origin, age, veteran status, disability, sex, sexual orientation, gender (including gender identity and gender expression), or any other basis prohibited by law. Retaliation against anyone involved in the complaint process is a violation of College district policy.

Statement of Eligibility for an Occupational Licensure: Effective September 1, 2017, HB 1508 amends the Texas Occupational Code Section 53 that requires education providers to notify potential or enrolled students that a criminal history may make them ineligible for an occupational license upon program completion. The following website provides links to information about the licensing process and requirements: https://www.bon.texas.gov/licensure_eligibility.asp. See also www.tdlr.texas.gov for additional information. Should you wish to request a review of the impact of criminal history on your potential Vocational Nurse License prior to or during your quest for a degree, you can visit this link and request a “Criminal History Evaluation”: https://www.bon.texas.gov/licensure_endorsement.asp. This information is being provided to all persons who apply or enroll in the program, with notice of the requirements as described above, regardless of whether the person has been convicted of a criminal offense. Additionally, HB 1508 authorizes licensing agencies to require reimbursements when a student fails to receive the required notice.

Chapter 1: Self-Assessment

Core Objectives:

- Define and interpret mathematical symbols associated with dose calculation & medication administration.
- Review of whole numbers.
- Insert leading zeroes and eliminate trailing zeroes.
- Place values & rounding.
- Convert fractions, decimal numbers, and percent.
- Calculation of % of whole numbers.
- Memorize common nursing abbreviations including those NOT to use.

Learning Content:

1. Math Symbols important to Nursing
2. Place Values
3. Implied decimal points & leading/trailing zeroes
4. Rounding
5. Equivalents:
 - a. Percentages
 - b. Decimals
 - c. Fractions
6. Determining the % of whole numbers
7. Standard & DO NOT use abbreviations

Chapter 2: Dimensional Analysis

Core Objectives:

- Identify the three required elements needed to solve dimensional analysis equations.
- Introduction of conversion factors.
- Set up, evaluate, and solve dimensional analysis equations with the required elements.

Learning Content

1. Three required elements of all dimensional analysis equations
2. Conversion factor review
 - A. Same dimension
 - B. Different dimension
3. Dimensional analysis equation review
 - A. Identifying correct equation set-up.

Chapter 3: Metric Units and Conversions

Core Objective:

- Identify the three-base unit of metric measurement for weight (mass), volume, and length.
- Calculate equivalent values of weight (mass), volume and length used in metric dose calculations: micrograms, milligrams, grams, kilograms, milliliters, and liters.
- Differentiate milligram, milliliter, and milliequivalent.
- Verify metric conversions using dimensional analysis.
- Differentiate metric and household measurements.
- Use approved abbreviations for metric units.

Learning Content

1. Metric measurements
2. Metric prefixes, values, and meaning & abbreviations
3. Writing metric units correctly
4. Equivalent metric measurements of weight (mass), volume & length
5. Converting milligrams to grams and grams to milligrams
6. Examining micrograms and clinical relevance
7. Milliequivalents (mEq) and clinical relevance
8. Other medication measurement systems
 - A. Household measurements
 - B. Household and metric liquid measuring containers

Chapter 4: Patient Records, Medication Orders, and Medication Labels

Core Objectives:

- Interpret medication orders and labels correctly.
- Identify abbreviations that cannot be used for handwritten medical records.
- Identify abbreviations that can lead to medication errors.
- Utilize The Joint Commission (TJC) and the Institute for Safe Medication Practices (ISMP)
- Medication-related recommendations.
- Interpret time using the 24-hour clock.
- Interpret Medication Administration Records (MARS and eMARS).
- Describe medication-related nurse actions that can lead to medication errors.
- Identify patients' rights.

Learning Content

1. Medication storage and security
2. Medication forms and packaging
3. Solid medication forms
4. Liquid medication forms
5. Medication routes
 - a. Non-parenteral
 - b. Parenteral
6. Frequency and times of medication administration
 - a. Abbreviations and terminology and times and frequency
 - b. Joint Commission “do not use” list.
 - c. List of error-prone abbreviations, symbols, and dose designations
7. The 24-hour clock
8. Medication orders
9. Interpreting medication orders and medication labels
10. Calculating dose based on label and order information.
11. Orders for two or more medications to be combined.
12. Telephone, verbal, and orders that must be clarified.
13. Medication administration records
14. Seven rights of medication administration

Chapter 5: Oral Medications

Core Objectives:

- Estimate, calculate, and evaluate a variety of solid and liquid medication doses.
- Calculate dosages for liquid medications to the nearest tenth of a milliliter.
- Measure oral liquids in a calibrated measuring cup.
- Measure syringe volumes in 3- and 5-mL syringes.
- Calculate and evaluate safe dose ranges (SDRs) for medication doses.

Learning Content

1. Oral solid dose calculations using estimation and dimensional analysis II.
2. Metric conversions by moving decimal places.
3. Estimating liquid dose medication orders.
4. Setting up dimensional analysis-style equations
 - A. When ordered dose and available unit match
 - B. When the ordered units do not match the available units
5. Equipment for administering oral liquid doses.

Chapter 6: Syringes for Injection

Core Objectives:

- State the total volume capacity for various syringes.
- Differentiate the calibrations (quantity values) for various syringe sizes per milliliter.
- State the lowest and nearest measurable dose for syringes.
- Select the appropriate syringe size for stated volumes.
- Draw a vertical line through an accurate dose on a syringe.
- Select the appropriate syringe for selected purposes.
- Identify safety principles related to syringes and needles.

- Define needle gauge and three criteria for needle selection.

Learning Content

1. Syringe sizes
2. Parts of the syringes
3. Total capacity and lowest measurable dose
4. Where to measure a dose on a syringes
5. Examining the calculated doses for correct syringe selection
6. Prefilled injectable syringes.
7. Prefilled medication cartridges for injections
8. Needle sizes
9. Safety Syringes and clinical relevance
10. Safety issues and disposal of sharps
11. Recommended fluid volume for selected sites.

Chapter 7: Reconstitution of Medications

Core Objectives:

- Distinguish routes of drugs for reconstitution.
- Interpret directions for dilution of reconstituted medications.
- Select the appropriate concentration to prepare for the ordered dose.
- Calculate doses for reconstituted medications using DA equations.
- Measure the appropriate dose using a medicine cap and a syringe.
- Identify appropriate notation on reconstituted multi-dose medication labels.
- Interpret directions for safe storage of reconstituted medications.
- Calculate ratio dilutions for partial-strength solutions.

Learning Content

1. Reconstituted medications
2. Expired reconstituted drugs and clinical relevance.
3. Reconstituting, calculating, measuring and selecting diluents to calculated oral doses.
4. Reconstituted parenteral drugs.
5. Reconstituted drug prefilled containers

6. Liquid concentrates: Diluting liquids
7. Inactive ingredients used for dilutions.
8. Converting dilution ratios to fractions and percentages.
9. Using a dimensional analysis equation to calculate the amount of concentrate.

Chapter 8: Injectable Medications

Core Objectives:

- Calculate and prepare intradermal, subcutaneous, and intramuscular doses.
- Calculate and combine doses for two medications to be mixed in one syringe.
- Identify safety hazards of injectable medications.

Learning Content

1. Intradermal injections
2. Subcutaneous injections
3. Intramuscular injections
4. Administering injections and clinical relevance
5. Parenteral mixes and clinical relevance
 - A. Mixing two medications in one syringe
 - B. Calculating the dose for a parenteral mix
6. Medications supplied in units.

Chapter 9: Basic Intravenous Calculations

Core Objectives:

- Interpret basic intravenous (IV) solution orders for peripheral infusion.
- Identify contents of commonly ordered IV fluids.
- Identify average flow rates for adults who are NPO and the general rationale for variations.
- Estimate, calculate, and verify flow rates for intermittent and continuous IV solutions with gravity and electronic devices.
- Calculate grams of dextrose and sodium chloride in IV fluids.
- Estimate and calculate the duration of flow for IV solutions in hours and minutes
- Identify patient safety assessment related to IV solution therapy.

Learning Content

1. Overview of intravenous therapy
 - A. Purpose of intravenous solutions
 - B. Maintenance intravenous flow rates
 2. Basic intravenous equipment and clinical relevance
 3. Types of intravenous solutions
 4. Tonicity of intravenous solutions
 5. Intravenous solution volume
 6. Intravenous solution orders for milliliters per hour
 7. Determining infusion durations
 8. Types of infusion delivery systems
 - A. Electronic infusion pumps and clinical relevance
 - B. Gravity infusions
 9. Intravenous administration sets
 - A. Infusion sets for gravity infusions
 - B. Calculating flow rates for gravity infusions
 1. Estimating drops per min for a drop factor of 60
 2. Counting drops per minute
- C. Intravenous piggyback solutions
1. Flow rates for IVPB infusions
 2. Simplified piggyback calculations for milliliter-per-hour settings
 3. IVPB flow rates (drops per minute)

10. Regulating and positioning gravity infusion devices
11. Flow rate errors
12. Monitoring the flow rate on infusion devices and clinical relevance
 - A. Drops per minute to milliliters per hour.
13. Monitoring pump alarms
 - A. Electronic infusion pump alarms
 - B. Volume to be infused alarm.
14. Keep open flow rates.
15. Calculating grams of solute
16. A word about potassium chloride
17. Intravenous intermittent solution delivery systems
 - A. Volume-control device (calibrated burette chamber)
 - B. Intravenous push medications and VN scope of practice
 - C. Syringe pump
18. Blood administration.

Chapter 10: Advanced Intravenous Calculations

Core Objectives:

- Calculate infusion flow rates for the following units of measurement: mg per mL, mg per hr, mg per min, mcg per mL, mcg per hr, mcg per min, mcg per kg, mcg per kg per hr, mcg per kg per min, mg per kg, mg per kg per hr, mg per kg per min, and mEq per hr.
- Confirm IV medication orders with safe dose range (SDR) criteria.
- Calculate the parameters of flow rates for titrated IV infusions.
- State the difference between central venous lines and peripheral venous lines.
- State the general purpose, contents, and types of hyperalimentation (PN) infusions.
- Identify patient safety issues for the administration of IV medications and PN infusions.

Learning Content

1. Intravenous calculations
2. Using conversion factors
3. Calculating flow rates
4. Flow rates requiring two conversion factors.
5. Flow rates for weight-based doses
6. Equipment for intravenous solutions containing medications.
7. Calculating milligrams per milliliter (mg per ml)
8. Calculating the dose of an infusing g solution
9. Intravenous solution and medications
10. Hyper alimentation: Parenteral nutrition.

Chapter 11: Antidiabetic Medications

Core Objectives:

- List tests and treatment options for patients receiving medications for type 1 and type 2 diabetes.
- Identify risks of look-alike generic oral anti-diabetic medications.
- Contrast the various insulin products by onset of action.
- Calculate and titrate subcutaneous and IV insulin dosages based on blood glucose levels.
- Evaluate blood glucose levels for prescribed insulin administration.
- Select the appropriate syringe and measure syringe doses for subcutaneous insulin administration.
- Identify the most common adverse effects of insulin therapy.
- Define hypoglycemia and hyperglycemia.
- Identify causes of, risks of, and nutrients needed for hypoglycemia.
- Identify critical patient safety issues related to anti-diabetic medications and blood glucose levels.

Learning Content

1. Vocabulary
2. Oral and injectable non-insulin anti-diabetic medications
3. Parenteral anti-diabetic medications: Insulin products:
 - A. Short & Rapid Acting

- B. Intermediate Acting
 - C. Short & Intermediate Combo
 - D. Long Acting
4. Steps to prepare doses for insulin syringes.
 5. Matching insulin concentration and syringes
 6. Reading units on insulin syringes
 7. Even and odd numbered scales on insulin syringe
 8. Lo-dose syringes.
 9. Sliding-scale insulin
 10. Mixing insulins: Short fast-acting and slower-acting intermediate mixes'
 11. When the mix must be prepared by the nurse
 12. Technique for preparing insulin mixes.
 13. Intravenous insulin infusions
 14. Insulin administration devices

Chapter 12: Anticoagulant Medications

Core Objectives:

- Differentiate oral and parenteral anticoagulants and related tests.
- Calculate doses for oral and parenteral anticoagulants.
- Evaluate and titrate anticoagulant doses based upon relevant laboratory tests.
- Identify antidotes for anticoagulant therapy.
- Identify critical patient safety issues related to anticoagulant therapy.

Learning Content

1. Anticoagulant vocabulary
2. Anticoagulation medicines & antidotes
3. Interpreting PT and INR results and clinical relevance
4. Injectable anticoagulants
5. Heparin flushes (low-dose concentrations)
6. Heparin for subcutaneous and intravenous administration
7. Heparin concentrations used for intravenous infusions.
8. Heparin preparations and preventing errors and clinical relevance.
9. Calculating heparin flow rates and determining mL per hour
10. Titrating heparin dose to aPTT values

Chapter 13: Pediatric Medications

Core Objectives:

- Distinguish the milligram (mg), microgram (mcg), gram (g), and square meter (m²) units of measurement.
- Evaluate orders for minimum and maximum pediatric SDR doses.
- Calculate pediatric weight-based doses for oral and parenteral routes.
- Define body surface area (BSA) and distinguish m² from mg and mcg metric measurements.
- Calculate flow rates for IV volume-control devices.
- State measures to prevent medication errors for pediatric patients.

Learning Content

1. Comparing adult and pediatric medication doses and schedules
2. Calculating kilogram from pounds or ounces
3. Calculating safe dose range (SDR)
4. Medication Administration Equipment & clinical relevance
5. Injection sites
6. Safe injection volumes
7. Intravenous injections
 - A. Using a volume-control device
 - B. Flushing a volume-control device
 - C. Calculating for a volume-control device
 - D. Syringe pump infusers
8. Comparing SDR & Order