Fall 9-2-2005

NUR 151.01: Drug Administration and Calculation

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The University Of Montana

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COLLEGE OF TECHNOLOGY
THE UNIVERSITY OF MONTANA – MISSOULA
COURSE SYLLABUS

HEALTH PROFESSIONS DEPARTMENT
Practical Nursing

COURSE NUMBER AND TITLE: NUR 151 Drug Administration and Calculation

DATE REVISED: August 15, 2005

SEMESTER CREDITS: 3

COURSE HOURS PER WEEK:
Class times: Mon. – Lec: 1 hr.
Tues. – Lab: 2 hrs.

PREREQUISITES: Successful completion of core classes; Coreq. NUR 152/55 & 154

INSTRUCTOR NAME: Michele Sare, MSN, RN
EMAIL ADDRESS: Michele.Sare@mso.umt.edu
TELEPHONE NUMBER: (406) 396-5155 (emergency = 544-7620 or 288-0022)
OFFICE LOCATION: Stanahan Building – North Reserve, Rm. 155
OFFICE HOURS: By appointment

RELATIONSHIP TO PROGRAM(S):
Application of computation skills as related to the administration of medications by various methods. Psychomotor skill development in the administration of medications.

COURSE DESCRIPTION:
Apothecary, metric, and household conversion factors and the application of these in accurately solving dosage problems enabling safe administration of oral medications, injectable drugs, and the intravenous fluids. Theory and practice in the laboratory setting, to acquire psychomotor skills for proper medication administration by all three routes.
STUDENT PERFORMANCE OUTCOMES:

Upon completion of this course, the student will be able to:
1. Convert apothecary, metric, or household weights and measures to its equivalent; e.g. apothecary to metric or household.
2. Utilize weight and measure equivalents to correctly solve oral and parenteral dosage problems.
3. Calculate IV drip rates using a variety of drip size administration sets.
4. Describe and demonstrate in the on-campus laboratory principles to safely prepare, administer and evaluate a variety of types of medications.

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES

1. Course grade will be based on objective tests and skill performance evaluations.
2. The grading scale is: A= 90-100%, B=80-89%, C=70-79%, D=60-69%, 59% and below=F
3. Students must have a grade of “B” in order to matriculate (passing grade – 80%).
4. All skill performances must be satisfactorily completed in order to pass this course.

ATTENDANCE POLICY

Regular attendance is expected. Lack of attendance will adversely affect final grades. A student may miss up to three class days without penalty, but the fourth absence, and each subsequent absence will result in a full letter grade reduction to the final course grade. If a student misses a class or lab, it is the student’s responsibility to make up for the absence. Tests are to be taken on the day they are scheduled. Makeup tests will be taken on the first day the student returns to class. All makeup tests will automatically have a 5% reduction in score. If the test is not taken within 5 days, an additional 10% will be deducted from the test grade each day – and is at the instructor’s discretion.

HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:

1. Instructor evaluation of methodology.
2. Evaluation by faculty in succeeding courses.
3. Evaluation by students themselves.

REQUIRED TEXT:

Basic pharmacology for Nursing; Clayton & Stock; Mosby

GRADING

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Quizzes</td>
<td>60%</td>
</tr>
<tr>
<td>Final exam</td>
<td>20%</td>
</tr>
<tr>
<td>Lab/skills</td>
<td>20%</td>
</tr>
</tbody>
</table>
CHEATING: Any student found to cheat will fail this course and be removed from the program.

Disability Services:
Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please speak with me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator.
For students planning to request testing accommodations, be sure to bring the form to me in advance of the two-day deadline for scheduling in the ASC.

UNIT 1: RATIO, PROPORTION AND GENERAL MATHEMATICS REVIEW

Central Objective: Assess general mathematics skills and the use of the ratio and proportion method to solve problems for X.

Student Objectives: Upon completion of this unit the student will be able to:

1. Attain a score of 90% or better on a mathematics diagnostic test.
2. Express whole Arabic numbers in Roman numerals.
3. Add, subtract, multiply and divide fractions, decimals, percents and ratios.
4. Reduce fractions to lowest terms.
5. Convert among fractions, decimals, percents and ratios.
6. Solve verbal and numerical ratio/proportion problems for X.
7. Calculate C - F.

Student Activities:

1. Take general mathematics diagnostic test in class.
2. Review Chapter 6 in Clayton & Stock (pgs. 59-67 & 75-76)
3. Complete practice problems assigned by instructor - check your answers.
4. Complete a plan of action submitted to instructor & self 😊 - sign/date
UNIT 2: SYSTEMS OF MEASUREMENT

Central Objective: Recognize and express the basic systems of measurement used to calculate dosages.

Student Objectives: Upon completion of this Unit, the student will be able to:

1. Interpret and properly express metric, apothecaries’ and household notation.
2. Memorize and recall metric, apothecaries’ and household equivalents.
3. Explain the use of mEq and U in dosage calculation.

Student Activities:

1. Read Chapter 6 – pgs. 67 – 72)

Clayton & Stock

2. Memorize conversion equivalencies within and between metric, apothecaries’ and household systems.
3. Take a written examination on conversion equivalencies and receive a 90% or better.
### Volume and Weight Equivalents

<table>
<thead>
<tr>
<th>Metric System</th>
<th>Apothecaries’ System</th>
<th>Household Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--</td>
<td>1 minim</td>
<td>1 drop</td>
</tr>
<tr>
<td>1 milliliter</td>
<td>15*-16 minims</td>
<td>15-16 drops</td>
</tr>
<tr>
<td>5 milliliters</td>
<td>1 dram (60 minims)</td>
<td>1 teaspoon (60 gtts)</td>
</tr>
<tr>
<td>15 milliliters</td>
<td>4 drams (3*-4 teaspoons)</td>
<td>1 tablespoon (1/2 ounce)</td>
</tr>
<tr>
<td>30 milliliters</td>
<td>1 ounce (8 drams)</td>
<td>2 tablespoons (1 ounce)</td>
</tr>
<tr>
<td>180 milliliters</td>
<td>6 ounces</td>
<td>1 teacup</td>
</tr>
<tr>
<td>240 milliliters</td>
<td>8 ounces</td>
<td>1 glass/measuring cup</td>
</tr>
<tr>
<td>500 milliliters</td>
<td>1 pint</td>
<td>1 pint (16 ounces)</td>
</tr>
<tr>
<td>1000 milliliters</td>
<td>1 quart</td>
<td>1 quart (32 ounces)</td>
</tr>
<tr>
<td></td>
<td>2 pints</td>
<td>1 quart</td>
</tr>
<tr>
<td></td>
<td>4 quarts</td>
<td>1 gallon</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.60-0.65 milligrams</td>
<td>gr 1/100</td>
<td>--</td>
</tr>
<tr>
<td>0.5 milligrams</td>
<td>gr 1/120</td>
<td>--</td>
</tr>
<tr>
<td>0.4 milligrams</td>
<td>gr 1/150</td>
<td>--</td>
</tr>
<tr>
<td>0.3 milligrams</td>
<td>gr 1/200</td>
<td>--</td>
</tr>
<tr>
<td>0.2 milligrams</td>
<td>gr 1/300</td>
<td>--</td>
</tr>
<tr>
<td>1000 micrograms</td>
<td>gr 1/60</td>
<td>--</td>
</tr>
<tr>
<td>1 mg (1000 mcg)</td>
<td>gr 1/60</td>
<td>--</td>
</tr>
<tr>
<td>4 mg</td>
<td>gr 1/15</td>
<td>--</td>
</tr>
<tr>
<td>6 mg</td>
<td>gr 1/10</td>
<td>--</td>
</tr>
<tr>
<td>10 mg</td>
<td>gr 1/6</td>
<td>--</td>
</tr>
<tr>
<td>15 mg</td>
<td>gr ¼</td>
<td>--</td>
</tr>
<tr>
<td>60 milligrams</td>
<td>1 grain</td>
<td>--</td>
</tr>
<tr>
<td>1 gram (1000 mg)</td>
<td>15 grains</td>
<td>--</td>
</tr>
<tr>
<td>5 grams</td>
<td>1 dram</td>
<td>--</td>
</tr>
<tr>
<td>15 grams</td>
<td>4 drams</td>
<td>--</td>
</tr>
<tr>
<td>30 grams</td>
<td>8 drams</td>
<td>1 ounce</td>
</tr>
<tr>
<td>454 grams</td>
<td>12 ounces</td>
<td>1 pound</td>
</tr>
<tr>
<td>1 kilogram (1000 grams)</td>
<td>--</td>
<td>2.2 pounds</td>
</tr>
</tbody>
</table>

* Use for this class 😊
UNIT 3: *Principles of Medication Administration*

**Central Objective:** To correctly interpret the medication order, read the medication label, legal & ethical considerations of med. administration, patient charts/records, drug systems, and measuring the prescribed dosage.

**Student Objectives:** Upon completion of this Unit, the student will be able to:

1. Recognize and select the appropriate equipment for the medication, dosage and method of administration ordered.
2. Read and interpret the calibrations of each utensil presented.
3. Interpret a medication order, including proper medical notations and abbreviations.
4. Read and interpret labels of medication for the following information:
   a. Brand and generic name.
   b. Dosage strength
   c. Dosage for m
   d. Total volume of container
   e. Manufacturer’s name
   f. Expiration date.
5. Know the 6 Rights
6. Express understanding of the ethical & legal considerations of med. Administration
8. Demonstrate understanding & use of Medication records

**Student Activities:**

1. Read Chapt. 7 – Clayton & Stock
2. Take a written examination on content to include medical terminology and receive a 80% or better.
3. Correctly apply knowledge in lab setting – med. orders, med. records, med. administration principles, & med. labels
UNIT 4: ORAL DOSAGES OF DRUGS & ADMINISTRATION

Central Objective: To correctly calculate the oral dosages of drugs and demonstrate correct technique when pouring meds. To safely and correctly administer all types of oral medications.

Student Objectives: Upon completion of this Unit, the student will be able to:

1. Convert all units of measurement to the same system.
2. Set up and solve the dosage calculation using the ratio-proportion method.
3. Describe factors to consider when choosing a route of medication administration.
4. Correctly calculate a prescribed oral medication dosage.
5. Correctly prepare and administer oral medications.

Student Activities

1. Read Chapter 4 & 9 – Clayton & Stock
2. Work all review problems in workbook
3. Take and attain at least a 80% score on an oral dosage calculation test.
4. In the campus lab, practice correct preparation and administration of enteral meds.

Take and attain at least an 80% on a written exam on principles of medication administration.
UNIT 5: CALCULATING & ADMINISTERING PARENTERAL DOSAGES

Central Objective: To accurately calculate parenteral dosages of drugs, including insulin, heparin, and powders for reconstitution. To safely and correctly administer subcutaneous, intramuscular and intradermal medications.

Student Objectives: Upon completion of this Unit, the student will be able to:

1. Convert all units of measurement to the same system.
2. Utilize the ratio-proportion dosage calculation method to correctly solve parenteral dosage problems.
3. Reconstitute and label medications supplied in powder form.
4. Accurately measure insulin in a matching insulin syringe – both single and combined doses.
5. Identify important information on insulin labels.
6. Calculate s.c. doses of heparin.
7. State the importance of correct heparin dose and technique administration.
8. Describe the different types of syringes and needles for parenteral administration.
9. Discuss factors to consider in selecting a syringe and needle size.
10. Explain the difference between ampules and vials.
11. Describe the procedure to mix medications in one syringe.
12. Discuss the procedure for preparing an injection of one type insulin and an injection mixing two kinds of insulin.

1. Read Chapter 10 & 11 – Clayton & Stock.
2. Complete all review sets and practice problems in Chapts. 10 & 11 and check your answers.
3. Take and attain at least an 80% or greater on a parenteral dosage calculation examination.
4. Give shots to lots of oranges 😊
5. View videos on parenteral medication administration.
6. Correctly calculate a variety of SQ, ID, and IM drug dosages.
7. In the campus lab, practice correct sterile preparation and administration of IM, ID, and SQ medications for various patient scenarios.
13. Locate the accepted sites for subcutaneous and ID injections.
14. Compare the angle of needle insertion for IM vs. SQ vs. ID
15. Locate the accepted sites for intramuscular injections.
16. Discuss the maximum volume of injected medication based on injection site and route.
17. Describe the 2 track method of injection.
18. Explain techniques to enhance and slow absorption of injected medications.
19. Correctly calculate a prescribed parenteral medication dosage.
20. Correctly prepare and administer, using sterile technique throughout, doses of IM, ID, and SQ medications.

**NOTE:** This is an application unit...Here is where you will prepare & administer medications. Please wear clothing that allows for easy access to the deltoid, abdominal, and forearm sites 😊....yep...you will all give 'shots' in these sites 😊
UNIT 7: CALCULATING IV DRIP RATES

Central Objective: To calculate intravenous solution flow rates for electronic or manual infusion systems.

Student Objectives: Upon completion of this Unit, the student will be able to:

1. Identify common IV solutions.
2. Define the following terms: IV, peripheral line, central line, primary IV, secondary IV, piggyback, and saline/heparin lock.
3. Calculate milliliters per hour.
4. Recognize the drop factor in gtt/ml as stated on the tubing package.
5. Calculate IV flow rate in gtt/min.
6. Recalculate the flow rate when the IV is off schedule.
7. Calculate small volume piggyback (IVPB) flow rate in gtt/min.
8. Describe primary and secondary IV sets
9. Discuss the difference between IVPB and IV bolus
10. Describe an intermittent IV access system

Student Activities

1. Read Chapter 12 – Clayton & Stock
2. Complete all review sets and practice problems – Chapt. 12 - and check your answers.
3. Take and attain an 80% or greater on an IV flow rate calculation examination.