

**EL CAMINO COLLEGE
COURSE OUTLINE OF RECORD**

OBSOLETE

I. COURSE DESCRIPTION

Course Title and Number : Nursing 48 (Official)

Descriptive Title : Dosage Calculations

Discipline : Nursing

Division : Health Sciences and Athletics

Course Length : Full Term
 Other (specify: 9 weeks)

Hours Lecture : 3

Hours Laboratory : 3

Laboratory :

Course Units : 2

Grading Method : Letter
 Pass/No Pass
 Both
 No Grade

Course Type : Credit, Degree Applicable
 Credit, Not Degree Applicable
 Non-Credit

Transfer CSU : Yes (Effective Date: April 8, 1996)
 No

Transfer UC : Yes (Approval Date:)
 Pending
 No

Conditions of Enrollment: Specify Prerequisite, Corequisite, Recommended Preparation, Enrollment Limitation, or None.

Prerequisite: eligibility for Mathematics 73 or Mathematics 80

Catalog Description :

This course reviews and utilizes mathematical concepts needed in calculating accurate and safe medication dosages. Advanced problem solving, application of algebraic concepts, formulas, proportional relationships, systems of measurement, and measurement system conversions will be incorporated in the learning process. Designated lab time will be provided related to clinical scenarios involving correct medication formulas and calculations, the selection of correct medical equipment to prepare and administer various types of medication, careful reading and interpretation of sample physician orders, and evaluation of medication labels for safe medication administration.

ORSO**II. COURSE OBJECTIVES**

List the major objectives of the course. These must be stated in behaviorally measurable terms.

1. Demonstrate the application of mathematical concepts when calculating oral and parenteral drug dosages for adults.
2. Convert metric, apothecary, and household measurements from one system to another.
3. Carefully interpret medication labels and medication administration records to safely administer drug dosages utilizing the six rights of medication administration.
4. Reconstitute injectable and non-injectable drugs and select the correct syringe and calibrated medical equipment necessary to safely administer these medications.
5. Identify medication errors that can occur from hospital abbreviations, drug names, written metric dosages, and the actions necessary to prevent them.
6. Demonstrate the ability to calculate safe oral and parenteral drug dosages for pediatric patients.
7. Determine intravenous (IV) flow rates, infusion times, and volumes using a variety of IV tubings, drop factors, and infusion pumps.
8. Calculate advanced IV drug dosages and rates including milliliters per minute (mL/min), milliliters per hour (mL/hr), milligrams per hour (mg/hr), micrograms per minute (mcg/min), and micrograms per kilogram per minute (mcg/kg/min).
9. Demonstrate the ability to safely prepare and administer accurately calculated medication dosages in a simulated clinical environment.

III. OUTLINE OF SUBJECT MATTER

The topics should be detailed enough to enable an instructor to determine the major areas that should be covered and so that the course may have consistency from instructor to instructor and semester to semester.

Approximate Time in Hours	Major Topics
1.5	I. Systems of Measurement A. Lecture 1. Metric, Apothecary, Household 2. Conversions and approximate equivalents 3. Equipment used in dosage measurement
1.5	B. Lab 1. Demonstrate the application of various systems of measurement using selected clinical scenarios
1.5	II. Equipment Used in Dosage Measurements A. Lecture 1. Medicine cups with approximate equivalent measure 2. Calibrated droppers 3. Needles and syringes
1.5	B. Lab 1. Demonstrate the correct application of equipment used in dosage measurements using selected clinical scenarios
1.5	III. Clinical Applications of Time and Temperature A. Lecture 1. Traditional and international time 2. Celsius and Fahrenheit temperatures 3. Conversion formulas
1.5	B. Lab 1. Demonstrate the clinical application of time and temperature using selected clinical scenarios
1.5	IV. Medication Administration A. Lecture 1. Interpreting drug order 2. Understanding drug labels

- 3. Preventing medication errors

- 1.5 B. Lab
 - 1. Demonstrate safe medication administration techniques using selected clinical scenarios

- 1.5 V. Oral Drug Dosages
 - A. Lecture
 - 1. Calculation formulas
 - 2. Tablets and capsules
 - 3. Oral liquids

- 1.5 B. Lab
 - 1. Demonstrate safe application of oral drug dosage calculations using selected clinical scenarios

- 1.5 VI. Parenteral Drug Dosages
 - A. Lecture
 - 1. Calculation formulas
 - 2. Parenteral solutions
 - 3. Insulin

- 1.5 B. Lab
 - 1. Demonstrate safe application of parenteral drug dosage calculations using selected clinical scenarios

- 1.5 VII. Reconstitution of Injectable Solutions
 - A. Lecture
 - 1. Reconstitution formulas
 - 2. Single-strength solutions
 - 3. Multiple-dose vials

- 1.5 B. Lab
 - 1. Demonstrate safe reconstitution of injectable solutions using selected clinical scenarios

- 1.5 VIII. Reconstitution of Non-Injectable Solutions
 - A. Lecture
 - 1. Solution concentrations and calculations
 - 2. Irrigants
 - 3. Enteral feedings

- 1.5 B. Lab
 - 1. Demonstrate safe reconstitution of non-injectable solutions using selected clinical scenarios

- 1.5 IX. Dosage Calculations Based on Body Weight
 - A. Lecture
 - 1. Adult and pediatric calculations (including body surface area)
 - 2. Total dosage range per kilogram with maximum daily allowances
 - 3. Underdosage

- 1.5 B. Lab
 - 1. Demonstrate safe dosage calculations based on body weight using selected clinical scenarios

- 1.5 X. Alternative Dosage Calculations
 - A. Lecture
 - 1. Ratio-proportion
 - 2. Dimensional analysis

- 1.5 B. Lab
 - 1. Demonstrate alternative dosage calculations using selected clinical scenarios

- 1.5 XI. Intravenous (IV) Solutions, Equipment, and Rate Calculations
 - A. Lecture
 - 1. IV solutions
 - 2. IV equipment
 - 3. IV calculations for electronic and manually regulated flow rates

- 1.5 B. Lab
 - 1. Demonstrate the safe application of IV solutions, equipment, and calculations using selected clinical scenarios

- 1.5 XII. IV Calculations for Time and Volume
 - A. Lecture
 - 1. Calculating IV infusion times
 - 2. Calculating IV infusion volumes
 - 3. Adjusting IV rates based on time and volume

- 1.5 B. Lab
 - 1. Demonstrate safe application of IV calculations for time, volume, and the adjustment of IV rates using selected clinical scenarios

- 1.5 XIII. Intermittent IV Medications
A. Lecture
1. IV piggybacks
2. IV push medications
3. Saline and heparin locks
- 1.5 B. Lab
1. Demonstrate safe application of intermittent IV medications using selected clinical scenarios
- 1.5 XIV. Advanced Pediatric Calculations
A. Lecture
1. Pediatric volume control sets
2. Minimal dilutions for IV medications
3. Calculations for daily volume of maintenance fluids
- 1.5 B. Lab
1. Demonstrate the application of advanced pediatric calculations using selected clinical scenarios
- 1.5 XV. Advanced IV Calculations
A. Lecture
1. IV medication ordered per kilogram per minute
2. Titration formulas
3. Blood administration
- 1.5 B. Lab
1. Demonstrate safe application of advanced IV medications based on weight and time, safe titration of IV medications, and blood administration using selected clinical scenarios
- 1.5 XVI. Heparin Protocols
A. Lecture
1. Heparin calculations
2. Heparin titration
3. Drug alerts
- 1.5 B. Lab
1. Demonstrate the safe application of heparin protocols using selected clinical scenarios
- 1.5 XVII. Critical Care IV Calculations

- A. Lecture
 - 1. IV medications ordered as milligrams per minute
 - 2. IV medications ordered as micrograms per minute
 - 3. IV medications ordered as micrograms per kilogram

- 1.5 B. Lab
 - 1. Demonstrate the safe application of critical care IV calculations using selected clinical scenarios

- 1.5 XVIII. Dosage Calculations
 - A. Lecture
 - 1. Cumulative Review of Dosage Calculations

 - B. Lab
 - 1. Demonstrate the safe application of various dosage calculations using selected clinical scenarios

- 54 TOTAL HOURS

IV. METHODS OF EVALUATION

A. CREDIT, DEGREE APPLICABLE AND CREDIT, NOT DEGREE APPLICABLE COURSES

Check the PRIMARY method of evaluation for this course.

- Substantial writing assignments
- Problem solving demonstrations (computational or non-computational)
- Skill demonstrations

A minimum of one response in 1, 2, or 3 below, as applicable, is required. However, you may check all that apply.

1. Indicate the types of writing assignments used as primary or secondary methods of evaluation for this course.

- Essay exams
- Written homework
- Term or other papers
- Reading reports
- Laboratory reports
- Other (specify)

2. Indicate the types of problem-solving demonstrations used as primary or secondary methods of evaluation for this course.

- Exams
- Laboratory reports
- Quizzes
- Homework problems
- Fieldwork
- Other (specify)

3. Indicate the types of skill demonstrations used as primary or secondary methods of evaluation for this course.

- Class performance
- Performance exams
- Fieldwork
- Other (specify)

4. If objective exams are also used, check all that apply.

- Multiple choice
 - Completion
 - Matching items
 - True/false
 - Other (specify)
- Exams with dosage calculations

B. NON-CREDIT COURSE

Indicate the methods of evaluation that will be used to determine that the stated objectives have been met.

Not applicable.

V. COURSEWORK

A. TYPICAL ASSIGNMENT

Provide an example of a typical assignment. This assignment must correspond to the PRIMARY method of evaluation indicated in Section IV, Methods of Evaluation. That is, it must be a writing assignment or, if more appropriate, an assignment involving problem solving or skill demonstration.

Skill demonstration: From the following Intravenous (IV) labels, list the solute(s) of each solution, identify the strength of each solute in g/mL, identify the osmolarity of each solution in mOsm/L, identify the tonicity (isotonic, hypotonic, or hypertonic) of each solution, and the physiologic effects of each solution.

B. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS

Cite two specific assignments that demonstrate college-level critical thinking. (Required for degree applicable courses only.)

1. A child who is 28 inches tall and weighs 25 pounds will receive one dose of IV cisplatin. The recommended dosage is 37 to 75 mg/m² once every two to three weeks. The order reads cisplatin 18.5 mg IV at 1 mg/min today at 1500 hours. You have available a 50 mg vial of cisplatin. Reconstitution directions state to add 50 mL of sterile water to yield 1 mg/mL. Minimal dilution instructions require 2 mL of IV solution for every 1 mg of cisplatin. Given the ordered IV rate of 1 mg/mL, at what rate will you infuse this medication in mL/hr on the infusion pump? How long will it take for this medication to infuse?
2. A nurse is caring for a 167 pound client who becomes hypotensive secondary to cardiogenic shock. The physician orders dopamine 5mcg/kg/min IV stat. The concentration of dopamine provided is 400mg/250 ml in Dextrose 5% Water. The infusion pump rate has been set at 18 mL/hr. Is this calculated IV rate correct to achieve a dopaminergic response? If not, what is the actual dose of dopamine infusing at this rate? What physiologic response will occur with the currently infusing dose?

C. WORK OUTSIDE OF CLASS

Two hours of work outside of class are required for each hour of lecture or equivalent. Each student in this course will be required to participate in the following work outside of class time. Check all that apply.

- Study
- Answer questions
- Skill practice
- Required reading
- Problem solving activity
- Written work (such as essay/composition/report/analysis/research)
- Journal (done on a continuing basis throughout the semester)
- Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting)
- Course is lab only - minimum required hours satisfied by scheduled lab time
- Other (specify)

VI. INSTRUCTIONAL METHODOLOGY

Check all planned instructional activities that apply:

- Lecture
- Lab
- Discussion
- Multimedia presentations
- Demonstration
- Group activities
- Role play/simulation
- Guest speakers
- Field trips
- Other (specify)

NOTE: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instructional delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VII. TEXTS AND MATERIALS

If multiple selection is offered, only representative texts need be listed. An up-to-date list of required and recommended materials is maintained in the division office.

A. REQUIRED TEXTS (title, author, publisher, year)

Dosage Calculations by Gloria Pickar and Amy P. Abernethy, Del Mar Publishing,
2008

B. REQUIRED SUPPLEMENTARY READINGS**C. OTHER REQUIRED MATERIALS**

VIII. CONDITIONS OF ENROLLMENT

If this course has a prerequisite or corequisite, complete section A. If this course has an Enrollment Limitation, complete section B.

A. PREREQUISITE AND/OR COREQUISITE

1. Indicate if this course has a prerequisite, corequisite, both, or none.

- Prerequisite
 Corequisite

2. Indicate Type. Check all that apply.

- Sequential
 Computational/Communication Skills
 Health and Safety
 Non-Course
 Standard (If this is a Standard Prerequisite or Corequisite, attach CCC Form D.)

3. Entrance Skills/Knowledge

List the required skills and/or knowledge without which a student would be highly unlikely to receive a grade of A, B, C, or Credit (or for Health and Safety, would endanger self or others) in this course.

- a. Use the specialized vocabulary describing the real number system and its properties as well as the fundamentals of algebra.
b. Manipulate (evaluate, simplify or factor) algebraic expressions, including expressions with fractions and radicals.

B. ENROLLMENT LIMITATION

1. Indicate the category which describes the Enrollment Limitation for this course.

- Band/Orchestra
 Theater
 Speech
 Chorus
 Journalism
 Dance
 Intercollegiate Athletics
 Honors Course
 Blocks of Courses
 Other (specify)

2. List Degree and/or Certificate requirements that are met by this course.

3. List all El Camino College courses that also satisfy the requirements listed above in section B.2.

Originator: V.K. Townsend

Submittal Date: Fall 1995

BOARD APPROVAL DATE:

Reviewed and/or Revised by:

Kathy Morgan and Kathy Stephens

Date: December 1996

Kathleen Rosales and Monica

Date: May 29, 2009

Gross

Date:

