

**QUINSIGAMOND COMMUNITY COLLEGE**  
**PRACTICAL NURSING PROGRAM**

**PNP 111 – INTRODUCTION TO PHARMACOLOGY**  
**CLASS OF 2008**  
**FALL 2007**

## **I. COURSE DESCRIPTION**

The course examines fundamental pharmacological concepts, drug sources and forms, controlled substance schedules, pregnancy categories and drug references. Students learn the ethical and legal responsibilities associated with medication administration; and, review basic math concepts, common systems of measurement and calculation of drug dosages. The course focuses on nursing principles essential to safe administration of medication. Anti-infective and immunologic agent drugs serve as the model for discussion and demonstration.

Pre-Requisites: Acceptance to the Practical Nursing Program

Co-Requisites: BIO 140

## **II. LEVEL ONE OBJECTIVES**

1. Discuss the nursing process in providing basic care to a culturally diverse, older adult population, with self-care deficits.
2. Collect data from assigned clients.
3. Select nursing diagnosis applicable to assigned client.
4. Identify resources within the structured health care setting to assist with self-care needs of older adults.
5. List plan of care for meeting universal needs of assigned clients.
6. Demonstrate competency in the performance of fundamental nursing care skills.
7. Evaluate care given based on standardized nursing care plans.
8. Apply principles of safety in caring for an assigned client.
9. Outline communication skills.
10. Record assessment data with guidance.
11. Describe principles of verbal and non-verbal communications.
12. Describe critical thinking skills applicable to nursing.
13. Employ principles of teaching, to assist an assigned client in resolving selected knowledge deficits.
14. Define the role and responsibilities of health team members.
15. Outline the role expectations of practical nursing.
16. Identify content of NAPNES Code of Ethics.

## **III. COURSE OBJECTIVES**

Upon successful completion of the course, the student will be able to:

1. Identify two pharmaceutical discoveries of the 20th century.
2. Define the differences between a drug's chemical, generic, and trade name.
3. Define Pharmacokinetics and Pharmacodynamics.
4. Identify mechanisms of drug action.
5. Discuss the significance of drug-drug and drug-food interactions, and drug reactions.
6. Discuss signs, symptoms and care of adult clients experiencing mild reactions to anaphylactic drug allergies.
7. Identify physiologic factors and individual variables affecting drug action and response.
8. Discuss nursing implications associated with drug actions, interactions, and effects.
9. Demonstrate knowledge and understanding of the laws and agencies governing the manufacture, distribution and sale of drugs.
10. Recall the importance of the "controlled substances schedules", and the five "pregnancy categories".

11. Explain the characteristics and uses of the many dosage forms, and pharmaceutical preparations of, both non-parenteral and parenteral medications.
12. Identify abbreviations commonly associated with medication administration.
13. Discuss the essential components of a medication order.
14. Explain use of Nursing Drug Book.
15. Demonstrate correctly, principles of conversion among the metric, apothecary and household systems of measurement.
16. Calculate accurately, utilizing either the ratio and proportion or formula methods of problem solving.
17. Cite legal considerations inherent in the administration of medications.
18. Cite ethical considerations inherent in the administration of medications.
19. Identify the role of the nurse related to medication administration into the nursing process.

#### **IV. CURRICULUM DESIGN**

Introduction to Pharmacology is a course designed to assist the student to acquire basic knowledge and skills in the area of medication administration. The curriculum will progress from pharmacological fundamentals to principles and practice of medication administration

- I. Fundamentals of Pharmacology
- II. Refresher Math; Introduction to Drug Measures and Dosage Calculation
- III. Drug Forms, Drug Classifications, Drug References, Abbreviations used with Drug Administration, The Medication Order
- IV. Principles and Methods of Medication Administration, Label Reading and Immunologic Agents
- V. Client and Family teaching as related to Pharmacology.
- VI. Principles of Intravenous Administration
- VII. Model: Antibiotics and Anti-Infectives
- VIII. Drugs Utilized in the Management of Pain

Placement:	Semester I	
Course Hours:	45 Hours	3 Credits

The curriculum threads are concepts that appear throughout the curriculum. Each thread develops in complexity from the first semester courses through succeeding courses. The curriculum threads are:

- |                        |   |
|------------------------|---|
| 1. Communication       | 6. Nursing Process                                  |
| 2. Critical Thinking   | 7. Nutrition  |
| 3. Cultural Diversity  | 8. Pharmacodynamics                                 |
| 4. Health Education    | 9. Safety   |
| 5. Nursing Care Skills | 10. Standards of Practice and Trends in Health Care |

#### **V. METHOD OF INSTRUCTION**

Lecture and Visual Aids  
 Discussion  
 Written assignments  
 Critical Thinking Exercises  
 Textbooks  
 Overhead/PowerPoint Presentations

## VI. METHOD OF EVALUATION

Achievement of course objectives is measured primarily by written examinations.

Criteria for Grading and Evaluation:

Module exams *	80%
Final exam (cumulative)	<u>20%</u>
Total	100%

\*Module II Exam: Students who receive less than a passing grade on this exam will be given one opportunity for a retake (date and time to be announced). The average of these two exams will represent the actual grade recorded for Module II.

## VII. TEACHING PERSONNEL

Margaret A. Yoder                      Ext. 7477      Room 333A  
Available by posted office hours  
E-mail: [myoder@qcc.mass.edu](mailto:myoder@qcc.mass.edu)

## VIII. BIBLIOGRAPHY

Textbooks for PNP 111 - Introduction to Pharmacology

Curren, Anna M. Dimensional Analysis for Meds.  
3rd ed., Thomson Delmar Learning, New York, 2007.

Deglin and Vallerant, F. A. Davis. Davis Drug Guide for Nurses, 10<sup>th</sup> ed.,  
Philadelphia, 2007.

Roach, S. S. & Ford, S. M. Introductory Clinical Pharmacology, 8<sup>th</sup> ed., J.B. Lippincott Co.,  
Philadelphia, 2008

Roach, S. S. & Ford, S. M. Introductory Clinical Pharmacology Student Study Guide, 8<sup>th</sup> ed.,  
J.B. Lippincott Co., Philadelphia, 2008

## MODULE I: FUNDAMENTALS OF PHARMACOLOGY

Learning objectives: At the conclusion of this module, the student will:

1. Define key terms.
2. Discuss historical uses of drugs.
3. List at least four pharmaceutical discoveries of the 20th century.
4. Identify drug sources.
5. Identify a drug's chemical, generic, official and trade names.
6. Describe six uses of drugs.
7. Recall three mechanisms of drug action of pharmacodynamics.
8. Recognize the four processes associated with pharmacokinetics (absorption, distribution, metabolism and excretion).
9. Explain the meaning of the term "Drug Half-Life".
10. Identify Drug-Drug interactions and Drug-Food interactions.
11. Explain the differences between the following drug reactions: side effects; adverse/toxic effects; allergic reactions; idiosyncratic reaction; drug tolerance; cumulative drug effect; synergistic and teratogenic effect.
12. Recognize signs and symptoms of a mild, versus a severe to life threatening allergic-reaction.
13. Describe the role of each of the following factors in determining an individual's pharmacological response to a drug: age, body weight, body surface area, sex, disease states, placebo effect, route of administration, time of administration and compliance with medication regimen.
14. Discuss nursing implications associated with pharmacologic responses to drug therapy.
15. Identify the five areas of concern that have standards regulated by legislation.
16. Discuss the laws governing the manufacture, distribution and sale of drugs.
17. Identify the federal agencies that enforce drug laws.
18. Define the term "controlled substances".
19. Identify the five controlled substance schedules.
20. State the meaning and importance of the five pregnancy categories.
21. Discuss the use of botanical medications.

### MODULE I

Threads: 1, 5, 8, 9, 10

CONTENT	LEARNING ACTIVITY	EVALUATION
<b>Historical Aspects</b> <b>Drug sources</b> <b>Drug names</b> <b>Pharmacokinetics &amp; Pharmacodynamics</b> <b>Drug interactions/reactions</b> <b>Factors influencing Pharmacologic Responses</b> <b>Laws governing drugs</b> <b>Controlled substances schedules</b> <b>Pregnancy categories</b> <b>Herbal therapy/supplements</b>	<u>Roach</u> : Chapter 1 <b>Student workbook</b> <b>Assigned Readings</b>  <b>Study Guides</b>  <b>Handouts</b>  <b>Class Discussion</b> <b>Critical Thinking Exercises</b>	<b>Examination questions</b>

**MODULE II: REFRESHER MATH AND INTRODUCTION TO DRUG MEASURES AND DOSAGE CALCULATION.**

Learning objectives: At the conclusion of this module, the student will:

1. Define basic mathematics terminology.
2. Identify the relative value of decimals.
3. Demonstrate the ability to accurately add, subtract, multiply and divide decimals.
4. Identify the relative value of fractions.
5. Demonstrate the ability to accurately multiply and divide common fractions.
6. Define ratio and percent as they relate to solutions.
7. List the basic units and subunits of weight, volume, and length of the metric system.
8. Express metric weights and volumes using appropriate notation rules.
9. Convert accurately, apothecary and household measures to metric equivalents.
10. List the symbols, abbreviations, and notation rules for apothecary and household measures.
11. Convert accurately, apothecary and household measures to metric equivalents.
12. Explain why discrepancies exist in such conversions.
13. Demonstrate ability to use the dimensional analysis formula method for solving medication dosage problems.

**MODULE II**

**Threads: #1, 2, 5, 9, 10**

CONTENT	LEARNING ACTIVITY	EVALUATION
<p>Relative value of decimals Addition, subtraction, multiplication and division of decimals Relative value of fractions Multiplication and division of Fractions Ratio and Proportion Definitions/problem solving Solutions-ratio strengths and Percentage strengths Equivalents in decimals, fractions, ratios and percents The metric system-basic units and subunits of weight, volume and length Metric system notations Metric system-conversions within Apothecary and household systems, symbols, abbreviations, and notation rules Conversions between apothecary and household systems of measurement and the metric system Problem solving utilizing ratio and Proportion and the Formula Method</p>	<p><u>Curren:</u>  *Section one: Refresher Math Chapters 1, 2, 3 (Summer Pre-reading) Summary self tests  *Section two: Introduction to Drug Measures Chapter 4 – Metric, International (SI) System Chapter 5 – Unit percentage, milliequivalent Ratio, apothecary and household measurements Summary self tests  *Section four: Dosage Calculation Chapter 11 – Doseage Calculation using Dimensional Analysis Summary self tests  <u>Roach:</u> Chapter 3: pg 49 Roach student workbook Class Discussion  Critical Thinking Exercises</p>	<p>Examination questions  Problem solving activities</p>

**MODULE III DRUG FORMS; DRUG CLASSIFICATIONS; DRUG REFERENCES;  
ABBREVIATIONS USED WITH DRUG ADMINISTRATION;  
THE MEDICATION ORDER.**

Learning objectives: At the conclusion of this module, the student will:

1. Identify the properties and uses of each of the following drug forms:
  - a. Solid and semisolid preparations:
    - tablets, scored tablets, enteric coated tablets, buccal and sublingual tablets, layered tablets, caplets, capsules, controlled (sustained) release capsules, gelatin capsules, troches or lozenges, suppositories
  - b. Liquid and semi-liquid preparations:
    - solutions and suspensions
  - c. Additional forms of medication:
    - sprays, aerosols, creams, ointments, liniments, medicated patches.
  - d. Parenteral preparations:
    - ampules, vials, prefilled syringes.
  - e. OTC medications
  - f. Herbal preparations
2. Discuss the meaning of the term "drug classification".
3. List at least five sources of drug information (Drug references).
4. Demonstrate the ability to use a Nursing Drug Handbook.
5. Demonstrate knowledge of commonly used abbreviations associated with drug orders and drug administration.
6. Describe three methods for communicating medication orders.
7. Identify four types of medication orders.
8. List all the essential components of a medication order.

**MODULE III Threads: 1, 2, 4, 6, 8, 9, 10**

CONTENT	LEARNING ACTIVITY	EVALUATION
<p><b>Drug forms and properties</b>  <b>Drug classifications: definitions, actions, uses, interactions, side effects, nursing implications, common medications associated with drug classifications.</b>  <b>Sources of drug information</b>  <b>Utilization of Nurse's Drug Handbook</b>  <b>Common abbreviations associated with drug orders/administration.</b>  <b>Medication orders, methods of communication and types of orders.</b>  <b>The Medication Order</b></p>	<p><b><u>Curren:</u></b>  <b>Drug administration abbreviations (inside front cover)</b></p> <p><b>Nursing Drug Handbook Study Guides</b></p> <p><b>Handouts</b>  <b>Observation of Visuals</b></p> <p><b>Appendix A</b></p>	<p><b>Examination questions</b></p>

**MODULE IV PRINCIPLES AND METHODS OF MEDICATION ADMINISTRATION,  
LABEL READING AND IMMUNOLOGIC AGENTS**

**I. Principles and Methods of Medication Administration**

Learning objectives: At the conclusion of this module, the student will:

1. Name the five rights of medication administration.
2. List the various routes by which a drug may be given.
3. Identify factors about medications that the nurse must know prior to administration of any and all drugs.
4. Describe at least ten guidelines related to the preparation of medications for administration.
5. Discuss nursing responsibilities/ guidelines for administration of drugs.
6. Identify nursing responsibilities after drug administration.

**MODULE IV**

**Threads 1, 2, 3, 4, 5, 8, 9, 10**

<b>CONTENT</b>	<b>LEARNING ACTIVITY</b>	<b>EVALUATION</b>
<p><b>Key Terms</b></p> <p><b>The six rights of medication administration.</b></p> <p><b>Routes of administration</b></p> <p><b>Factors to know, prior to medication administration, about client and medications.</b></p> <p><b>Medication Administration, pharmacologic profile and client assessment</b></p> <p><b>Principles of medication administration.</b></p> <p><b>Guidelines related to preparation of medications for administration</b></p> <p><b>Nursing responsibilities following medication administration.</b></p>	<p><b>Roach: Chapter 2</b> <b>Student workbook</b></p> <p><b>Observation of Visuals</b></p> <p><b>Critical Thinking Exercises</b></p> <p><b>Class Discussion</b></p>	<p><b>Examination Questions</b></p>



**MODULE IV            continued**

III. Immunologic Agents

Learning objectives: At the conclusion of this module, the student will:

1. Discuss the use of vaccines, toxoids, and immune globulins to provide immunity against disease.
2. Name four commonly utilized viral vaccines.
3. Discuss preadministration and ongoing assessments the nurse should perform on the client receiving an immunologic agent.
4. Discuss ways to promote an optimal response, management of common adverse reactions, special considerations and important points to keep in mind when educating a client taking an immunologic agent.
5. Explain the importance of maintaining an immunization schedule.
6. Discuss use, adverse reactions, and nursing implications relative to the administration of the Influenza Vaccine.

**Module IV**

**Threads: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10**

<b>CONTENT</b>	<b>LEARNING ACTIVITY</b>	<b>EVALUATION</b>
<u>Immunologic Agents</u>  Types of immunity  Types of: vaccines, toxoids, and immune globulins  Action and use Adverse reactions Nursing implications Client teaching  Influenza vaccine	<u>Roach: Chapter 54</u>    Lecture & Discussion Critical Thinking Exercises  Handouts	Examination

**MODULE V THE NURSING PROCESS AND CLIENT AND FAMILY TEACHING AS RELATED TO PHARMACOLOGY**

Learning objectives: At the conclusion of this module, the student will:

1. Describe how the nursing process would be utilized in medication administration.
2. Discuss what is meant by an initial vs. an ongoing assessment, related to medication administration..
3. List several nursing interventions that would be appropriate for clients receiving medications.
4. Discuss the evaluation process as it relates to the administration of medications.
5. Define teaching and learning as it pertains to medication administration.
6. Explain how the nursing process can be used to develop a teaching plan, relevant to client medication.
7. Review principles of the teaching/learning process as related to adults and older adults.
8. Identify nursing considerations included in a client and family teaching plan

**MODULE V**

**Threads 1, 2, 3, 4, 5, 8, 9, 10**

<b>CONTENT</b>	<b>LEARNING ACTIVITY</b>	<b>EVALUATION</b>
<p><b>The nursing process and medication administration</b>  <b>Assessment criteria related to therapeutic effectiveness of client medications.</b>  <b>Nursing interventions related to medication administration</b>  <b>Evaluating response to medication</b></p>	<p><b><u>Roach:</u> Chapter 4</b>  <b>Roach student workbook</b></p> <p><b>Review the nursing process, function, purposes and components</b></p> <p><b>Critical Thinking Exercises</b></p>	<p><b>Examination Questions</b></p>
<p><b>The teaching plan as related to the nursing process</b>  <b>Key aspects of the teaching/learning process as related to medication administration</b></p>	<p><b><u>Roach:</u> Chapter 5</b>  <b>Roach student workbook</b>  <b>Review principles for adult/older teaching and learning</b></p> <p><b>Class Discussion</b>  <b>Critical Thinking Exercises</b></p>	

## MODULE VI

## PRINCIPLES OF INTRAVENOUS ADMINISTRATION

Learning objectives: At the conclusion of this module, the student will:

1. Differentiate between primary and secondary administration sets and peripheral and central IV lines.
2. Explain the function of drip chambers, roller and slide clamps and on-line And indwelling injection ports.
3. Differentiate between volumetric pumps, syringe pumps and PCA's
4. Identify abbreviations used for IV fluid orders and charting
5. Identify the calibrations in gtt/ml on IV administration sets
6. Calculate flow rates using the ratio and proportion and the formula methods.
7. Calculate flow rates by the division factor method
8. Recalculate flow rates to correct off-schedule infusions.
9. Calculate IV infusion times using:
  - Volume and hourly rate of infusion
  - Volume and gtt/min rate of infusion and set calibration
  - Start time and infusion time to determine completion times
  - Tape an IV solution bag tape to label start, progress and completion times
10. Calculate flow rates to infuse ordered dosages, dosages and flow rates based on kg body weight, dosage infusing from flow rate and solution strength and dosage and flow rate ranges for titrated medications.
11. Calculate ml/hr flow rates for microdrip and macrodrip sets
12. Calculate hourly dosage infusing from ml/hr and gtt/min rates.

CONTENT	LEARNING ACTIVITY	EVALUATION
Introduction to IV therapy Primary and secondary lines Volume controlled burettes Indwelling infusion ports Intermittent locks Volumetric pumps Syringe pumps Patient controlled analgesia devices Introduction to IV fluids Determining percentages n IV fluids Parenteral nutrition	<u>Curren</u>  Chapter 14  Summary self test Critical thinking exercises Class discussion	Examination Questions
IV flow rate calculation- Calculating large and small volume- gtt/min rates from ml/hr ordered Formula method of flow rate calculation Division factor method of calculation Regulating flow Rate Correcting off-schedule rates	Curren: Chapter 15  Class discussion Summary self test	Examination questions
Calculating IV infusion and completion times Calculating from volume and hourly rate ordered Calculating infusion time from gtt/min rate and set calculation Determining infusion completion time Labeling Solution bags	Curren: Chapter 16  Curren: Chapter 17	
Heparin infusion calculations Reading heparin labels and preparing IV solutions Calculating ml/hr flow rate from unit/hr ordered Calculating gtt/min flow rate from unit/hr ordered Calculating units/hr infusing from ml/hr infusing Caculating unit/hr infusing from solution strength, set calibration and gtt/min rate	Curren: Chapter 18  Class discussion Summary Self test	

## MODULE VII ANTIBIOTICS/ANTIINFECTIVES

### ANTIBIOTICS:

Learning objectives: At the conclusion of this module, the student will:

1. Describe the general principles of antibiotic therapy.
2. Identify characteristics that distinguish each class of antibiotic/anti-infective agents from other classes.
3. Name two medications associated with each classification of antibiotic agents.
4. Discuss the action and uses of each classification of antibiotic/anti-infective agents.
5. Identify major adverse reactions to and nursing responsibilities for each classification of antibiotic/anti-infective agents.
6. Identify precautions specific to administration of each type of antibiotic agent.
7. Apply the nursing process when administering antibiotic/anti-infective medications.
8. Describe a teaching plan for clients receiving antibiotic/anti-infective medications.

### Module VI

Threads: 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10

CONTENT	LEARNING ACTIVITY	EVALUATION
<p><u>Penicillins, Cephalosporins, Tetracyclines, Macrolides, Lincosamides, Fluoroquinolones, Aminoglycosides and miscellaneous Anti-infectives:</u></p> <p>Action and use Adverse reactions Drug resistance Nursing implications Client teaching</p>	<p><u>Roach:</u> Chapters 7, 8, 9, 10, 11 Roach student workbook</p> <p>Lecture &amp; Discussion Critical Thinking Exercises</p>	<p>Examination Questions</p>

**MODULE VIII DRUGS UTILIZED IN THE MANAGEMENT OF PAIN**

Learning objective: At the conclusion of this module, the student will:

1. Discuss the general drug actions of narcotic analgesics and narcotic antagonists.
2. Describe the effects of a narcotic on organs and structures of the body.
3. Identify the uses of narcotic analgesics and narcotic antagonists
4. List the major adverse reactions associated with the administration of a narcotic analgesic and narcotic antagonist.
5. Use the nursing process when administering a narcotic analgesic and a narcotic antagonist.
6. Discuss the nursing implications to be considered when administering narcotics, narcotic antagonists, and muscle relaxants.
7. State the uses of local and general anesthetics.
8. Describe, briefly, the four stages of general anesthesia
9. Discuss the nursing responsibilities when a local or general anesthetic is given.
10. Discuss the nursing responsibilities appropriate when caring for a client receiving conscious sedation.
11. Discuss specific points to be included in a teaching plan for clients receiving drugs during the perioperative phases.

**Module VIII Threads: 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10**

CONTENT	LEARNING ACTIVITY	EVALUATION
<p>Drug Classifications:</p> <p>Opiod Analgesics                      Opiod Antagonists                      Muscle Relaxants                      Anesthetics</p> <p>For each of the above classifications, exploration of medication use as related to:</p> <p>Action and Use                      Adverse Reactions                      Nursing Management                      Nursing Implications                      Teaching Plan</p>	<p><u>Roach</u>: Chapter 19</p> <p><u>Roach</u>: Chapter 20</p> <p><u>Roach</u>: Chapter 21</p> <p>Roach student workbook</p> <p>Lecture &amp; Discussion                      Critical Thinking Exercises</p> <p>Lecture &amp; discussion                      Critical thinking exercises</p>	<p>Examination Questions</p>

## EXAMINATION DATES

<b>Module I</b>	<b>September 12, 2007</b>
<b>Module II</b>	<b>September 26, 2007</b>
<b>Module III and IV</b>	<b>October 24, 2007</b>
<b>Module V</b>	<b>November 7, 2007</b>
<b>Module VI</b>	<b>November 21, 2007</b>
<b>Module VII</b>	<b>December 5, 2007</b>
<b>Module VIII (Included in Final Exam)</b>	<b>December 12, 2007</b>

**\*\*Please note that this syllabus may be subject to change. \*\***

**STATEMENT OF UNDERSTANDING REGARDING CLINICAL AND THEORY PROCESS**

I have read the Evaluation Policies for PNP 111, and I understand all of the implications. This means that to pass PNP 111, I must achieve a grade of C or better to be allowed to continue.

Signed \_\_\_\_\_

Print Name \_\_\_\_\_

Instructor \_\_\_\_\_