Nursing 116: Pharmacology for Nurses

I. Course Description:

This course focuses on those components of pharmacology related to safe nursing care. It includes information about the general classification of drugs and principles of therapy related to the effects, actions and therapeutic use of each drug. The nursing actions and rationale for nursing actions are covered. Clinical application is integrated into the clinical nursing courses.

II. Prerequisites:
1. English 101
2. Demonstration of Math Competency
3. Demonstration of Reading Competency
4. Psychology 101
5. Biology 204 (BIOL 204) and Biology 206 (BIOL 206) or Biology 200 (BIOL 200) and Biology 202 (BIOL 202)
6. Biology 220 (BIOL 220) General Microbiology
7. Admission to the Nursing Program.

Corequisites, if any:
1. NURS 110 Nursing Process 1
2. NURS 111 Nursing Skills Laboratory 1
3. NURS 112 Nursing Process Application 1
4. Introduction to Sociology (SOC 101) or Cultural Anthropology (ANTH

III. Course Objectives:

I. Discuss Federal and State laws that regulate pharmacologic agents as they apply to nursing activities.
2. Explain the nurse’s legal responsibilities related to administering medications.
3. Describe the major classification of drugs as they relate to specific body systems.
4. Relate the major classification of drugs to the application of nursing care.
5. Contrast the similar properties of drugs within each classification.
6. Explain the actions, effects and therapeutic uses of each major classification of drugs.
7. Demonstrate understanding of cultural-psychosocial aspects of patient care related to patient teaching and compliance in administration of medications.
IV. Specific Course Information

A. **Absences:** A student can miss 2.3 hours of this class

B. **Grading**
   1. 75% of the grade will derive from semester quizzes, tests, and drug cards
   2. A comprehensive final examination will be given that will count 25% of course grade and must be passed with a 75%

V. Texts:

A. **Required**

B. **Recommended**
   1. Craig, G. *Clinical Calculations Made Easy.* Lippincott, Williams & Wilkins
   3. Straight A’s in Nursing Pharmacology. Lippincott, Williams & Wilkins

VI. Content Modules:

Module A: Principles of Pharmacology

**Section 1:** Introduction to Drug Therapy/The Nursing Process and Drug Administration

**Section 2:** Peripheral Autonomic Nervous Systems: Drugs Affecting Transmission and Function

**Section 3:** CNS: Drugs Affecting Behavior Psychotic State, Pain Sensation, Muscle Control and Sleep

**Section 4:** Cardiovascular System: Drugs Affecting Cardiac Function, Blood Pressure, Renal Function and Coagulation

**Section 5:** Drugs Affecting the Endocrine System: Hormones and Related Compounds

**Section 6:** Drugs Affecting the Respiratory System

**Section 7:** Drugs Affecting the GI System

**Section 8:** Invading Organisms: Agents that Kill Invaders

**Section 9:** Neoplastic Cells: Drugs Affecting Cell Growth and Viability

**Section 10:** Drugs Affecting the Eye and Ear

**Section 11:** Drugs Affecting Nutrition & Fluids
Module A: Principles of Pharmacology

1. Statement of Purpose

Man has used drugs throughout the ages to produce desired body changes. The scientific study of drugs called pharmacology is, however, fairly recent. The exact nature of each drug is not well understood but new information is being released each day. This course presents pharmacologic agents according to major classifications, their actions, effects, and therapeutic uses related to each body system. The unique response of each individual to drugs is considered.

2. Terminology

| Pure Food & Drug Act                        | Antagonist  |
| United States Pharmacopeia (USP)           | Agonist     |
| National Formulary (NF)                    | Affinity    |
| Federal Food, Drug & Cosmetic Act          | Chelate     |
| Harrison Act                               | Stimulation |
| Controlled Substance Act                   | Depression  |
| Pharmacology                               | Replacement |
| Therapeutics                               | Bacteriostatic |
| Toxicology                                 | Bactericidal |
| Pharmacodynamics                           | Time/Response Relationships |
| Primary effect                             | Dose/Response Relationships |
| Secondary effect                           | Potency     |
| Drug absorption                            | Pharmacokinetics |
| Drug distribution                          | Physicians' Desk Reference (PDR) |
| Pharmacologic receptors                    |             |

3. Learning Activities

- Develop a drug card for each major drug classification.
- Computer Programs for major drug classification.
Section 1: The Basic Principles of Pharmacology/ The Nursing Process and Drug Administration

Classroom Objectives

1. Define the module terminology list and all other unknown words.
2. Review administration of drugs:
   a. Calculating dosages
   b. Medication orders
   c. Routes of administration
   d. Patient rights
   e. Nurse’s legal-ethical responsibility
3. Discuss general principles of drug therapy.
   a. Describe receptors and their function in pharmacology
   b. Apply Pharmacokinetics and dosing schedules.
   c. Define the function of absorption, distribution, metabolism and elimination of common medications.
   d. Pediatric dosages
   e. Geriatric dosages
4. Explain nursing actions relative to monitoring drug therapy.

Learning Activities

1. Complete the terminology list for the module and all other unknown words. Discuss in class any terms not understood.
2. Explore in class other references such as, the PDR, Facts and Comparisons, Govoni & Hayes, The Nurse’s Drug Handbook and/or Nursing Drug Handbook.
3. Differentiate among each of the following drug actions:
   a. Side effects
   b. Adverse Reaction
   c. Toxic effects
   d. Allergic reaction
   e. Idiosyncratic reaction
4. Read assigned references
5. View assigned videos and computer software.
Section 2: Peripheral Autonomic Nervous System: Drugs Affecting Transmission and Function

Classroom Objectives

1. Describe the general characteristics of the autonomic nervous system.
2. Describe drugs affecting the parasympathetic nervous system and autonomic ganglia.
3. Describe drugs affecting the sympathetic nervous system.
4. Describe the major classification of drugs that affect the autonomic nervous system:
   a. Adrenergic drugs-
      Adrenergil agonists and antagonists
      Indirect acting anti-adrenergilic agents
   b. Cholinergic drugs-
      Muscarinic agonist and antagonists
      Cholinesterase inhibitors
      Neuromuscular blocking agents and ganglionic blocking agents
5. Describe principles of drug therapy that relate to the autonomic nervous system.
6. Explain nursing actions with rationale for each autonomic nervous system drug.
7. Describe and use and function of neuromuscular blocking agents.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of Parasympathetic and Sympathetic medications. Include the nurse=s responsibility in monitoring these drugs as they are administered to a patient. Be specific about patient teaching.
2. Examine other references for drugs related to the autonomic nervous system.
3. Discuss issues encountered in administering drugs in the clinical setting relative to the autonomic nervous system.
4. Complete the terminology list for the module. Discuss in class any terms not understood.
5. Read assigned references
6. View assigned videos and computer software.
Section 3: CNS: Drugs Affecting Behavior, Psychotic State, Pain Sensation, Muscle Control and Sleep

Classroom Objectives

1. Describe the general characteristics of drugs used to relieve pain and inflammation.
   a. analgesics and antipyretics
   b. anesthetics
   c. anti-inflammatory drugs
   d. drugs used to treat hyperuricemia and gout
2. Describe the major classification of drugs that affect the Central Nervous System:
   a. Narcotic Analgesics and Narcotic Antagonists
   b. Sedatives - Hypnotics
   c. Antianxiety Drugs
   d. Antipsychotic Drugs
   e. Antidepressants
   f. Anticonvulsants
   g. Antiparkinson Drugs
   h. Skeletal Muscle Relaxants
   i. Anesthetics
   J. Central Nervous System Stimulants
3. Explain nursing actions with a rationale for each for CNS drugs.
4. Discuss principles of drug therapy that related to these drugs.
5. Describe patient teaching activities relative to these drugs.
6. Discuss Substance Abuse
   a. Drug
   b. Alcohol

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of the drugs used to affect the CNS, relieve pain and inflammation. Include the nurse’s responsibility in monitoring these drugs as they are administered to a patient. Be specific about teaching responsibilities.
2. Examine the PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to the CNS, Pain, and inflammation.
3. Discuss issues encountered in administering drugs in the clinical setting relative to the CNS, pain relief and inflammation.
4. Complete the terminology list for the module. Discuss in class any terms not understood.
5. Read assigned references
6. View assigned videos and computer software.
Section 4: Cardiovascular System: Drugs Affecting Cardiac Function, Blood Pressure, Renal Function and Coagulation

Classroom Objectives

1. Describe the major classification of drugs that affect the cardiovascular system:
   a. Digitalis glycosides
   b. Antiarrhythmic drugs
   c. Antianginal drugs
   d. Drugs used in hypotension and shock
   e. Antihypertension drugs
   f. Diuretics
   g. Anticoagulants, antiplatelet, and thrombolytic agents
   h. Lipid lowering drugs

2. Discuss principles of drug therapy that relate to drugs that affect the cardiovascular system.
3. Explain nursing actions with rationale for each for the cardiovascular system.
4. Describe patient teaching activities relative to the cardiovascular system.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of drugs affecting the cardiovascular system. Include the nurse's responsibility in monitoring these drugs as they are administered to a patient. Be specific about patient teaching.
2. Examine the PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to the cardiovascular system.
3. Discuss issues encountered in administering drugs in the clinical setting relative to the cardiovascular system.
4. Read assigned references
5. View assigned videos and computer software.
Section 5: Drugs Affecting the Endocrine Systems: Hormones and Related Compounds

Classroom Objectives

1. Describe the major classification of drugs that affect the endocrine system:
   a. Hypothalamic & Pituitary Hormones
   b. Corticosteroids
   c. Thyroid & antithyroid drugs
   d. Hormones that regulate calcium & phosphorus metabolism
   e. Antidiabetic drugs
   f. Female sex hormones
   g. Ovulation stimulants
   h. Male sex hormones
2. Discuss principles of drug therapy that relate to the endocrine and reproductive systems.
3. Explain nursing actions with rationale for each for the endocrine and reproductive system drugs.
4. Describe patient teaching activities relative to endocrine and reproductive system drugs.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of drugs affecting the endocrine and reproductive system. Include the nurse's responsibility in monitoring the drugs as they are administered to a patient. Be specific about patient teaching responsibilities.
2. Examine the PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to the endocrine and reproductive system.
3. Discuss issues encountered in administering drugs in the clinical setting relative to the endocrine and reproductive system.
4. Read assigned references
5. View assigned videos and computer software.
Section 6: Drugs Affecting the Respiratory System

Classroom Objectives:

1. Describe the major classifications of drugs that affect the respiratory system:
   a. Bronchodilating and antiasthmatic drugs
   b. Antihistamines
   c. Nasal decongestants, antitussive, mucolytics and cold remedies
   d. Glucocorticoid
2. Discuss principles of drug therapy that relate to drugs that affect the respiratory system.
3. Explain nursing action with rationale for each for the respiratory system drugs.

Learning Activities

1. Given case scenario, give the effects, actions and therapeutic uses of drugs affecting the respiratory system. Include the nurse's responsibility in monitoring these drugs as they are administered to a patient. Be specific about patient teaching.
2. Examine PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to the respiratory system.
3. Discuss issues encountered in administering drugs in the clinical setting relative to the respiratory system.
4. Read assigned references
5. View assigned videos and computer software.
Section 7:  Drugs Affecting the GI System

Classroom Objectives:

1. Describe the major classification of drugs that affect the digestive system.
   a. Drugs used in peptic ulcer disease
   b. Laxatives and cathartics
   c. Antidiarrheals
   d. Antiemetics
2. Discuss principles of drug therapy that relate to the digestive system.
3. Explain nursing actions with rationale for each for the digestive system drugs.
4. Describe patient teaching activities relative to the digestive system drugs.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of drugs affecting digestive system. Include nutrients and fluids and electrolytes. Give the nurse's responsibility in monitoring these drugs as they are administered to a patient. Be specific about patient teaching responsibilities.
2. Examine the PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to the digestive system.
3. Discuss issues encountered in administering drugs in the clinical setting relative to the digestive system.
4. Read assigned references
5. View assigned videos and computer software.
Section 8:  Invading Organisms: Agents that Kill Invaders

Classroom Objectives

1. Describe major classifications of anti-microbial drugs:
   a. Penicillins
   b. Cephalosporins
   c. Aminoglycosides
   d. Tetracyclines
   f. Macrolides
   g. Sulfonamides & urinary antiseptics
   h. Antitubercular drugs
   i. Antiviral drugs
   j. Antifungal drugs
   k. Antiparasitics

2. Discuss principles of drug therapy that relate to anti-microbial drugs.
3. Explain nursing actions with rationale for each for the anti-microbial drugs.
4. Describe patient teaching activities relative to anti-microbial drugs.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of anti-microbial drugs. Include the nurse's responsibility in monitoring these drugs as they are administered to a patient. Be specific about teaching responsibilities.
2. Discuss issues involved with administration of these drugs in the clinical setting.
3. Read assigned references
4. View assigned videos and computer software.
Section 9: Neoplastic Cells: Drugs Affecting Cell Growth and Viability

Classroom Objectives

1. Describe the major classifications of antineoplastic drugs:
   a. Alkylating agents
   b. Nitrosoureas
   c. Antimetabolites
   d. Alkaloids
   e. Antibiotics
   f. Hormones
   g. Radioactive iodine
2. Discuss major medications used in dermatologic conditions.
3. Discuss principles of drug therapy that relate to these drugs.
4. Explain nursing actions with rationale for each for these drugs.
5. Describe patient teaching activities relative to drugs for special conditions.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of drugs used for special conditions. Include the nurse's responsibility in monitoring these drugs as they are administered to a patient. Be specific about patient teaching responsibilities.
2. Examine the PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to these special conditions.
3. Discuss issues encountered in the clinical setting relative to these drugs.
4. Discuss issues encountered when a patient is suspected of substance abuse.
5. Read assigned references
Section 10: Drugs Affecting the Eye and Ear

Classroom Objectives

1. Describe the major classifications of drugs used in the eye.
   a. Drugs used in the treatment of glaucoma
      1) agents which decrease the formation of aqueous humor
      2) drugs which increase the outflow of aqueous humor
      3) drugs which decrease formation and increase outflow of aqueous humor
   b. Mydriatic drugs
   c. Ophthalmic anti-infectives
   d. Antiseptics
   e. Local anesthetics
   f. Corticosteroids
   g. Miscellaneous drugs

2. Discuss principles of drug therapy that relate to drugs that are used in the eye.

3. Explain nursing actions with rationale for the drugs used in the eye.

4. Describe patient teaching activities relative to these drugs.

Learning Activities

1. Given a case scenario, give the effects, actions and therapeutic uses of drugs used in the eye. Include the nurse's responsibility in monitoring these drugs as they are administered to a patient. Be specific about patient teaching.

2. Examine the PDR, Facts & Comparisons, Nurse's Drug Handbook or other reference for drugs related to drugs used in the eye.

3. Discuss issues encountered in administering drugs in the clinical setting relative to the eye.

4. Read assigned references

5. View assigned videos and computer software.
Section 11:  Drugs Affecting Nutrition & Fluids

Classroom Objectives

1. Describe the major classification of drugs affecting nutrition.
   a. Drugs used to treat nutritional anemia
   b. Vitamins
   c. Minerals and other nutritional agents
   d. Drugs used to treat hyperlipidemia
2. Discuss principles of drug therapy that relate to nutrition.
3. Explain nursing actions with rationale for each nutritional drug.
4. Describe patient teaching activities relative to the drugs affecting nutrition.

Learning Activities

1. Given case scenario, give the effects, actions and therapeutic uses of drugs affecting nutrition. Give the nurse’s responsibility in monitoring these drugs as they are administered to a patient.
2. Discuss principles of drug therapy related to these drugs.
3. Discuss issues encountered in administering drugs in the clinical setting relative to nutrition.
   a. Describe the method of administering Imferon
4. Describe patient teaching activities relative to drug affecting nutrition.
5. Read assigned references
6. View assigned videos and computer software
Pharmacology Drug Card Assignments

One: Peripheral Automatic Nervous System
- Muscarinic Agonists & Antagonists
- Cholinesterase Inhibition
- Neuromuscular Blocking Agents & Ganglionic Blocking Agents
- Adrenergic Agonists
- Adrenergic Antagonists
- Indirect - Acting Anti-Adrenergic Agents

Two: Parkinson’s- Dopaminergic drugs
- Anticholinergic drugs

Epilepsy: Phenytoin (Dilantin)
- Barbiturates
- Benzodiazepines
- Valproate (Deporote)
- Carbamazepine(Tegretol)
- Magnesium Sulfate

Spasms: Centerly acting muscle relaxants Opiod (narcotic)
- Analgesics + Antagonists
- Local anestesia:

Headaches: Analgesics
- Ergotamin
- Sumatripton (Triptine)
- Abortive vs. Prophylactic

Antipsychotic Agents
- Traditional Antipsychotic Agents
- Atypical Antipsychotics

Anti-Depressants
- Tricyclic Antidepressants
- Selective Serotonin Reuptake Inhibitors (SSRI=s)
- Monoamine Oxidase Inhibitors (MOI)
- Atypical: Buproipion (Wellbutrin, zyban)
- Trazodone (Desyrel)
- Nefazodone (Serazone)
- Venlafaxine (Effexor)
- Mirtazepine (Remeron)

Bipolar Disorder
- Lithium
- Carbamazepine (Tegretol)

Anxiety
- Benzodiazepines
- Barbiturates
- Nonbenzodiazepine - Non Barbiturates

CNS Stimulants (optional)
- Amphetamines
- Methylphenidate
- Methylxanthines
Three: Cardiovascular
   Diuretic: High-Ceiling (Loop) Diuretics
      Thiazide
      Potassium-sparing diuretics
      Osmotic Diuretics
Hypertension
   Angiotensin - Converting Enzyme Inhibitors (ACE)
   Angiotensin II Receptor Antagonists (ARB)
   Calcium Channel Blockers
      Dihydropyridines
      Phenylalkylamines
      Benzothiazepines
   Vasodilators
      Hydralazine
      Minoxidil
   Beta Blockers
   Alpha Blockers Alpha Agonists
   Adrenergic Neuro Blockers
   CHF - Cardiac Glycosides (Digitalis)
   MI - Thrombolytic Therapy
Anti-Dysrhythmic
   Class I - Sodium Channel Blockers
   Class II - Beta Blockers
   Class III - Potassium Channel Blockers
   Class IV - Calcium Channel Blockers
Hypercholesteremia
   HMG CoA Reductase Inhibitors (Statins)
   Bile Acid - Binding Resins
   Nicotinic Acid (Niacin)
   Gemfibrozil (Lopid)
   Fibric Acid Derivatives (Fibrates)
MI Thrombolic Therapy
   Anticoagulant
   Antiplatelet
   Parentezal Anticoagulants
   Oral Anticoagulants
   Antiplatelet

Four: Diabetes
   Insulin (Describe types)
   Sulfonylureas
   Biguanides (Metformin)
   Alpha - Glucosidase Inhibitors
   Acarbose (Frecose)
   Miglitil (Glyset)
   Thiazolidinediones (Glitozines)
   Meglitinides (Repallinide) (Prandia)
   Rosiglitazarone (Avandia)
   Proglitazone (Actos)

Thyroid
Levothyroxine (T4) (Levoxyl, synnthroid)
Liothyronine (T3) (Cytomel)
Propylthiouracil (PTU)
Radioactive Iodine
Hypothalamine / Pituitary (optional)
  Growth Hormone
  Prolactin
  Antidiuretic Hormone
  Oxytocin
  Adrenal Cortex
  Replacement Therapy in Adrenocortical insuficiency
  Inhibitors of corticosteroid synthesis
Estrogen/ Progestin
  Menopause
  BCP
Androgens
  Testosterone

Five: Antihistamines
  1st Generation: Alkylamines
                  Ethanolamines
                  Phenothiazine
                  Piperidines
  2nd Generation
                  Cetirizine
                  Fexofendine
                  Loratadine
Arthritis/Anti-inflammatory
  NSAIDS: Salicytes
          Propionic Acid Derivatives
          Acetaminophen
Gout
  Allopurinol (zyloprim)
  Colchicine
Respiratory
  Beta2 Adrenergic Agonists
  Glucocorticoids
  Cromolyn
  Methylxanthines
  Anticholinergic
  Leukotrine Antagonist
  Nasal Decongestant

Six: Peptic Ulcer
  Histamine 2 - Reception Antagonists
  Proton Pump Inhibitors
  Sucralfate
  Misoprostol
  Antacids
  Anticholinergic
Laxatives
  Bulk Formine Laxatives
Surfactant Laxatives
Stimulant Laxatives
Osmotic Laxatives
Lactulose
Lubricants

Antiemetics
Serotonin Antagonists
Dopamine Antagonists
Cannabinoids

Antidiarreal
Opioid
Other

Seven:
Antimicrobials
Weak Cell Wall I & II
Inhibitors of Protein Synthesis (Bacterial SIHR)
Inhibitors of Protein Synthesis (Bactericidal)
Sulfonmides/Trimethoprim
Antimycobacterial
Fluoroquinolones
Metronidazole
Anti fungal
Anti viral I & II (HIV-non HIV)
Anthemintics
Anti Protozoal Drugs
Ectoparasiticipes - Redicuire

Eight: Cancer Chemotherapy
Cytotoxic drugs
Alkylatine Agents
Antimetabolite
Antitumor antibiotics
Mitotic Inhibitors
Topoisomerase Inhibitors
Hormones and hormone antagonists
Biologic response modifiers

Nine:
Eye/Ear
Cycloplebic
Mydaintics

Ten: Obesity Drugs
Pharmacologic
Drug Card Guidelines

The purpose of these drug cards is to have all students research drug classifications, outline them and then create a learning product. When these steps are taken your learning is enhanced. Any short cuts that you may take will be revealed in your clinical practice and didactic tests.

All drug cards will follow the following format, or your groups grade will be severely impacted (5 points per error).

All papers will be typed with roman or courier, no underlining, bold, or italics will be accepted. No pictures or designer graphics that add only looks with no informational content. Large and small case lettering must be used as with all APA format.

All papers will have headers on each page with title (drug class) and each group members name (last name and first initial). Pages shall be numbered in proper sequence in top right hand corner (see page).

All papers will be in Paragraph form, no listing or outlining, unless used with appropriate APA indications.

All classifications need to be described fully in regards to 1) how the class of drugs work, 2) use and effects of the class of drugs, 3) side effects, adverse reactions, contraindications, & drug interactions and 4) you need to evaluate the above to determine the nurse’s monitoring or teaching priorities.

Remember, you only need to explore the drug classification. Individual drugs need not be explored in this format, unless specifically requested. Many of the classifications are explained by using a drug prototype. You may also use this drug in your explanation (Beta Blockers = Inderal).