This course covers the classification of medications and basic principles of pharmacology from legislation and pharmacokinetics through receptor theory, pharmacodynamics and pharmaotherapeutics. Medications will be grouped by body systems and treatment options will be related to the pathophysiological state of the patient. Drug groups are discussed rather than individual medications, with emphasis on autonomic, central nervous system, and cardiovascular agents. Drugs affecting all body systems will be discussed.
COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. describe how core concepts in pharmacology relate to human physiology
2. predict potential side effects from the use of drugs in the major drug groups studied.
3. explain how drugs interact with receptors to either enhance or block a physiologic response.
4. identify appropriate drugs based on their mechanisms of action.
5. identify the major drug groups and their therapeutic uses.

COURSE OBJECTIVES:

1. Describe membrane properties with respect to drug passage noting the effects of solubility, size, and ionization and especially the role of pH in the ionization of acidic and alkaline medications.
2. Describe fundamentals of drug mechanisms of action noting receptor and non-receptor based examples and the interacting roles of full and partial agonists and competitive and noncompetitive antagonists.
3. Classify major drug groups based upon their mechanism of action, chemical structure, and major therapeutic uses.
4. Evaluate the benefits and risks of using each kind of drug studied. Relate these benefits and risks to various physiological and pathological states the patient might display
5. Relate the sites and mechanisms of action, patterns of absorption, distribution, transformation, and excretion of drugs to possible drug interactions and to individual patient differences.
6. Employ knowledge of drug legislation in determining the proper way to handle and administer drugs.
7. Develop skills and vocabulary to use pharmacological literature and drug references to identify and evaluate therapeutic uses, side or toxic effects, and special cautions or contraindications of drugs.
8. Outline from memory all major drug groups that could potentially affect each different body system.
9. Develop computer skills to accurately and efficiently use online medical texts and drug reference texts.

COURSE CONTENT:

LECTURE CONTENT:

A. Course Introduction
   1. Online orientation to computer skills for health professionals
   2. Legislation: drug approval and testing process
   3. Experimental designs Fundamentals
      a. efficacy vs. potency
      b. half-life dosing
B. Administration of medications
   1. Drug references
   2. Routes of Administration
      a. local administration
      b. systemic administration
   3. Actions of drugs in the body
      a. Receptor theory
         i. full agonists
         ii. antagonists
         iii. partial agonists
      b. Drug absorption factors
c. Drug distribution factors
d. Drug metabolism factors
e. Drug elimination factors
f. Pharmacodynamics
   i. the physical state of the patient
   ii. genetic differences
   iii. mechanisms of drug interactions
4. Drugs of the peripheral nervous system
   a. voluntary vs. autonomic systems
   b. Synapse structure
   c. Peripheral nervous system receptors
      i. alpha, beta 1, beta 2, muscarinic, nicotinic
d. Clinical usefulness and adverse effects of peripheral nervous system drugs
   e. Central and direct skeletal muscle relaxants
5. Cardiovascular drugs
   a. Pathophysiology of the cardiovascular system
      i. basics of the conduction system
      ii. automaticity
      iii. functional refractory system
      iv. arrhythmias
      v. angina
      vi. blood pressure disorder
      vii. blood and coagulation disorders
   b. Therapeutic uses and adverse effects of cardiac drugs
      i. cardiac glycosides
      ii. anti-arrhythmics
      iii. cardiac stimulants
      iv. anti-anginal agents
      v. anti-hypertensive agents
      vi. hemopoietic agents
      vii. hemostatics
      viii. anti-coagulants
      ix. thrombolytics
      x. anti-lipemics
6. Central nervous system drugs (CNS)
   a. Fundamentals of CNS stimulation and depression
   b. Drug abuse
   c. Physical vs. psychological drug dependence
   d. CNS receptors
   e. Drug groups studied:
      i. stimulants
      ii. depressants
      iii. anti-epileptic agents
      iv. anti-parkinsonian agents
      v. narcotic analgesics
      vi. non-narcotic analgesics
      vii. anti-depressants
      viii. anti-anxiety agents
      ix. anti-psychotics
      x. drugs for bipolar disorders
      xi. anti-convulsants
7. Respiratory Drugs
   a. Respiratory gases
   b. Respiratory stimulants
   c. Bronchodilators
d. Respiratory anti-inflammatory agents
e. Anti-tussives
8. Demulcents
9. Expectorants
10. Nasal decongestants
11. Histamine antagonists

C. Gastrointestinal Drugs
1. Histamine antagonists
2. Antacids and antisecretory agents
3. Proton pump inhibitors
4. Digestants
5. Emetics and anti-emetics
6. cathartics
7. anti-diarrheics
8. carminatives
9. contrast media

D. Drugs affecting the eye, skin, and mucous membranes
1. Miotics, mydriatics
2. Drugs to reduce fluid formation
3. Anti-infectives
4. Anti-inflammatory agents

E. Drugs affecting the skin and mucous membranes
1. Emollients
2. Antiseptics
3. Keratolytics
4. Topical corticosteroids
5. Systemic acne medications

F. Anti-infectives and antineoplastics
1. Colonization vs. infection
2. Broad vs. narrow spectrum choices
3. Bacteriostatic vs. bactericidal action
4. Bacterial resistance
5. Factors affecting drug selection
6. Drug groups studied:
   a. penicillins
   b. cephalosporins
   c. carapenems
   d. monobactams
   e. vancomycin
   f. bacitracin
   g. aminoglycocides
   h. quinolones
   i. macrolides
   j. tetracycline

METHODS OF INSTRUCTION:

A. Lecture:
B. Online:
C. Independent Study:

INSTRUCTIONAL TECHNIQUES:
COURSE ASSIGNMENTS:

Reading Assignments

A. Required Readings. Text Drug reference books: Physician's Desk Reference (PDR) and Drugs Facts and Comparisons

Out-of-class Assignments

Library research and reading assignments.

Writing Assignments

1. Students should use drug reference standards found in library reserve section to complete assignments related to the drug groups studied in class. Assignments should require detail beyond that presented in class.
2. Analyze current professional journal articles using principles and vocabulary learned in class.
3. Write essays and short answers demonstrating proficiency in published course objectives.

METHODS OF STUDENT EVALUATION:

Midterm Exam
Final Exam
Written Assignments
Essay Examinations
Objective Examinations
Report
Problem Solving Exercises

Demonstration of Critical Thinking:

1. Use knowledge of pharmacological, physiological and pathological principles to evaluate drug safety and effectiveness in various clinical situations.
2. Discuss fundamental principles of pharmacodynamics and pharmacokinetics including receptor theory and membrane characteristics.
3. Discuss current drug approval methods contrasting benefits and risks of the current process.
4. Predict potential drug properties and interactions given fundamental facts such as protein binding properties or solubility and ionization characteristics of the drugs involved.
5. Given various alternatives, select and defend your choice of therapy for a given patient including benefits and risks for the individual.

Required Writing, Problem Solving, Skills Demonstration:

1. Students should use drug reference standards found in library reserve section to complete assignments related to the drug groups studied in class. Assignments should require detail beyond that presented in class.
2. Analyze current professional journal articles using principles and vocabulary learned in class.
3. Write essays and short answers demonstrating proficiency in published course objectives.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

Other:
1. Purchase or have regular access to:
2. Physician's Desk Reference
3. Drug Facts and Comparison

LIBRARY:

Adequate library resources include: Print Materials
Online Materials
Comments: