El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA	**Dental Hygiene**
COURSE RUBRIC AND NUMBER	**DHYG 1235**
COURSE TITLE	**Pharmacology for the Dental Hygienist**
COURSE CREDIT HOURS	**2 (Credit) 2 : 0 (Lec Lab)**

I. Catalog Description

Studies the classification of drugs and their uses, actions, interactions, side effects, contraindications with emphasis on dental applications. A grade of "C" or better is required in this course to take the next course. **Prerequisites: DHYG 1103 and DHYG 1201 and DHYG 1219 and DHYG 1239 and DHYG 1304 and DHYG 1431. Corequisites: BIOL 2420 or BIOL 2421 and DHYG 1211 and DHYG 1261 and DHYG 2201. (2:0).**

II. Course Objectives

A. Unit I. Information, Sources, and Regulatory Agencies

1. Define the term "drug" as used in medical treatment.
2. Give four reasons why knowledge about drugs is important in the practice of dentistry.
3. Describe the difference between over-the-counter (OTC) and prescription drugs.
4. Define and differentiate between the chemical, generic, and trade names for drugs.
5. Tell when a pharmacist may substitute a drug from one company with a similar product from another company.
6. Utilize the Physician's Desk Reference for Prescription Drugs, Physician's Desk Reference for Non-prescription Drugs and computer programs found on the clinic computer in the Dental Hygiene Clinic, room A-110I, to determine if a medication that the patient might be taking will influence the dental treatment.
7. Describe the functions of the Food and Drug Administration (FDA) and the Drug Enforcement Agency (DEA).
8. Describe what is considered a controlled substance, whether the controlled substance can be legally dispensed, and how the DEA controls those substances it considers do have some medical value.
9. Name and define the three classes of drugs that the DEA controls and at least two examples of each class.
10. Determine the possible indications and contradindications when treating a dental hygiene patient who is taking medications.

    a. Drug misuse
    b. Drug abuse
    c. Abstinence syndrome
    d. Physical dependence
    e. Psychological dependence
    f. Tolerance
    g. Cross-tolerance
    e. Additive effects

B. Units II - IV. Basic Pharmacologic Principles

1. Name three general methods of classifying drugs.
2. Explain what is meant by the therapeutic effect of a drug.
3. Define the following terms as they pertain to the therapeutic effects of a drug: potency, efficacy, and the dose-effect or dose response curve.
4. Explain what is meant by drug action at the receptor sites and name three types of substances that act on these receptors.
5. Name four types of drug activities that can occur at the receptor sites.
6. Explain what is meant by the "route of entry" of a drug.
7. Describe the difference between the enteral and parenteral methods of administering drugs and name three parenteral methods for drug administration.
8. Name one advantage and two disadvantages to administering drugs by mouth.
9. Name two advantages and two disadvantages to administering drugs intravenously (IV).
10. Trace the passage of a drug from administration to elimination using the following terms: absorption, distribution, metabolism, and excretion.
11. Name three membranes that a drug must cross during absorption and distribution.
12. Name two ways that drugs cross membranes and name five factors of the membrane that effect this transport.
13. Describe how drug solubility, drug ionization, and lipid solubility effect drug transport.
14. Describe what is meant by drug absorption and name two factors that effect this absorption.
15. Describe what is meant by the distribution of a drug and name three factors that influence this distribution.
16. Locate the main place in the body where drugs are detoxified and explain why this process is called biotransformation.
17. Explain what is meant by the "first pass effect" of drugs when a drug is administered through the digestive tract.
18. Explain what is meant by drug excretion or elimination and name the main body site and two secondary body sites where drug elimination may take place.
19. Name ten factors that can alter the effects of drugs on patients.
20. Define what is meant by an "adverse drug reaction".
21. Name five predictable, dose related adverse drug reactions.
22. Name and describe two non-predictable, non-dose related adverse drug reactions.
23. Name the two body systems that are most effected by an allergic response and describe the effects of the allergic reaction on these body systems.
23. Name six different clinical signs of allergic responses to drugs.
25. Describe what happens in the body during an anaphylactic shock and then name the drug of choice for emergency treatment plus the two drugs that can be used in follow-up treatment.
26. Explain what is meant by a drug interaction, and then name three types of drug interactions.
27. Explain what a toxicologic evaluation of a drug is and then define the following terms as they pertain to a toxicologic evaluation: ED 50, LD 50, and therapeutic Index (TI).
28. Interpret a prescription that has been given to a patient.
29. Interpret the Latin abbreviations given in the lecture notes.

C. Unit V: Autonomic Nervous System & Drugs Affecting This System

1. Review the anatomy of the nervous system with special emphasis on the autonomic nervous system.
2. Review five functions of the parasympathetic nervous system.
3. Review five functions of the sympathetic nervous system.
4. Describe a neurotransmitter, using the following terms; synapse, function and receptor site.
5. Name the neurotransmitter for the skeletal muscle and a drug that mimics this activity and another that blocks it.
6. Name the neurotransmitter for the pre-ganglionic synapse for both the parasympathetic

nervous system (PANS) and the sympathetic nervous system (SANS) and name a drug that mimics this activity.

7. Name the neurotransmitter that acts at the end organs for the PANS system and name a drug the mimics this activity and one that blocks it.
8. Name the neurotransmitter that acts at the end organs for the SANS systems and name a drug that mimics this activity and another drug that blocks it.
9. Name a parasympathetic and a sympathetic neurotransmitter that function between synapses in the brain.
10. Explain what is meant by the following terms:

    a. Cholinergic
    b. Anticholinergic
    c. Adrenergic
    d. Antiadrenergic
11. Describe the effects of cholinergic and anticholinergic drugs on the cardiovascular and digestive systems.
12. Describe the effects of adrenergic and antiadrenergic drugs on the cardiovascular, gastrointestinal, respiratory systems and also their effects on carbohydrate metabolism.
13. Identify the drugs used in dentistry that act on the autonomic nervous system and describe for what conditions they are used.

D. Unit VI: <u>Drugs Affecting the Cardiovascular System</u>

1. Review the anatomy, physiology and pathology of the cardiovascular system.
2. Review the symptoms of right and left-sided congestive heart failure and then name drug of choice used for treating these conditions.
3. Name the class of drugs that digitalis belongs to.
4. Describe the actions, side effects, and drug interactions that occur during digitalis therapy.
5. List three problems that may occur when providing dental treatment to a patient with congestive heart failure.
6. Review the conditions that can lead to congestive heart failure.
7. Review the physiology of blood pressure control.
8. Describe the alpha and beta activities of epinephrine and the effects these activities have on the heart, vascular system, and respiratory tract.
9. Review the pathology of hypertension.
10. Name the various types of drugs used to treat hypertension, their rationale for use the side effects from using these drugs, and drug interactions with other drugs.
11. Name five considerations that should be taken when providing dental treatment for a person taking drugs for hypertension.
12. Describe what antihyperlipedemic drugs are used to control.
13. Describe the actions and side effects of drugs used to treat arrhythmias.
14. Describe the dental considerations and drug interactions on a patient taking drugs for arrhythmias.
15. Review the physiology of the formation of blood clots, emboli, and thrombosis; and the symptoms of myocardial infarction or strokes.
16. List the most common type of drugs a patient might be taking if they have suffered from a myocardial infarction (heart attack) or a stroke.
17. Name the antagonist for dicumerol.
18. Describe angina, name drugs most commonly used to treat this condition and the mode of action of these drugs.
19. Explain what considerations that must be taken when providing dental care for a person with a history of angina.
20. Describe what shock is and treatment for it.
21. Name three groups of drugs that must be used with caution when treating a patient with cardiovascular diseases.

E. Unit VII: Adrenocorticosteroids

1. Review the functions of the endocrine system.
2. Review the effects of glucocorticosteriods and mineral corticosteroids on the body.
3. Name five indications for steroid therapy.
4. Name six complications that can occur during dental treatment on a patient on steroid therapy.
5. Explain how the "rule of two's" is applied to dental patients that are on steroid therapy.
6. Describe the dental indications for steroid therapy
7. Describe the effects of the sex hormones on oral tissues.
8. Describe the implications for dental treatment for patients that have hyper or hypo-active thyroid conditions.
9. Explain the effects excess parathormone can have on oral tissues.
10. Describe the effect calcitonin has on Ca++ plasma balance.
11. Describe dental treatment considerations for patients with conditions being treated by endocrine drugs such as insulin.
12. Describe how Orinase and other oral antihyperglycemic drugs are utilized in the treatment of some diabetics.
13. Review the effects of insulin on carbohydrate metabolism in the normal patient and when too little or too much insulin is available.

F. Unit VIII - IX: Anticonvulsant and Psychotherapeutic Drugs

1. Identify the two drugs most commonly used in the treatment of epilepsy.
2. Describe the effects of anti-epileptic drugs on the oral tissue and how these effects can modify dental treatment.
3. Identify drugs that are commonly used in dental treatment that are contraindicated in patients on therapy for epilepsy.
4. Identify the drug most frequently used to treat convulsions caused by drug overdose.
5. Give the group name for drugs used to treat psychosis and identify three groups of drugs that are additive to the effects of psychotic drugs.
6. Identify the drugs commonly prescribed for the different psychiatric disorders and describe their pharmacologic effects.
7. Describe how drugs used to treat psychiatric disorders may effect dental treatment.
8. Name the group of drugs that amphetamines belong to and name three uses for such drugs and five adverse effects.
9. Describe the activity of xanthines; name three members of this group of drugs; name three effects of this group of drugs and how their use may effect dental treatment.
10. Discuss what Ritalin is used for.

G. Unit X - XI: Pain Control- Local and General Anesthetic

1. Describe the difference between a local and a general anesthetic.
2. Explain the mechanism of action of local anesthetics.
2. Name the three different types of local anesthesia.
4. Name the two general chemical classifications of local anesthetics and explain why it is advantageous to have two such chemical groupings.
5. Explain what the terms hydrophilic & lipophilic mean.
6. Describe the role the hydrophilic and ends of a local anesthetic play in producing local anesthesia.
7. Describe the interaction of tissue pH and the amino base portion of a local anesthetic play in determining the effectiveness of a local anesthetic.
8. Name four general properties of ester local anesthetics and four general properties of amide local anesthetics.
9. Give the generic and most common trade names for four ester-type local anesthetics.
10. Name the main therapeutic use of cocaine and list three disadvantages to using this drug.
11. Give the generic and most common trade names for three amide-type local anesthetics.
12. Describe the routes of entry for Lidocaine; it's allergenic potential, and explain why a vasoconstrictor is added to the injectable form.
13. Explain why mepivacaine can be used with or without a vasoconstrictor and name a

cardiovascular condition where it would normally be used without a vasoconstrictor.

14. Describe the local anesthetic Bupivacaine as to indications for use, need of a vasoconstrictor, potency and toxicity.
15. Name two reasons vasoconstrictors are added to local anesthetics
16. Name the three most common types of adverse reactions to local anesthetics.
17. Name the two components in local anesthetics that cause most toxic reactions.
18. Describe the symptoms of the toxic reactions to vasoconstrictors in local anesthetics and explain why this type of reaction occurs.
19. Describe the CNS, respiratory & cardiovascular toxic response to an overdose of a local anesthetic and describe the treatment for each of these toxic responses.
20. Compare xylocaine and the other amides as to safety of use on pregnant women.
21. Name two main methods of administering general anesthesia in the dental office.
22. Describe how the body responds when a general anesthetic is administered using the four stages and three planes in this description.
23. Describe the use of nitrous oxide in dentistry, including a description of the: effects on the patient, method of delivery, advantages, disadvantages, safety precautions, possible toxic effects on members of the dental team, and contraindications for use on the patient. 5.3
24. Name the most common IV sedation analgesics used in dentistry and name advantages and disadvantages of their use.

H. Unit XII - XIII: Pain Control- Analgesics

1. Define what is meant by "pain" and name four different types of pain.
2. Name the three components of pain and using the three components describe how the pain impulse is initiated, transmitted to the CNS, and interpreted by the CNS.
3. Describe the difference between reception of pain and the reaction or response to pain and tell which one is constant and which one varies from person to person.
4. Describe how wide the response to the pain impulse can be and name five factors that can affect this response.
5. Define the following terms: anesthetic, analgesic, antipyretic, anti-inflammatory, non-opioid analgesics, and narcotic or opioid analgesics.
6. Name three neural autacoids associated with the pain sensation and describe the effect these neural autacoids have on the pain response.
7. Describe the effect that narcotics have on the pain center.
8. Name five other CNS centers besides the ones associated with pain that narcotic analgesics can affect.
9. Classify narcotics by their effect on the various CNS centers.
10. Describe what is meant by the terms "opioid" and "opiate".
11. Name the type of pain that narcotics are used to control.
12. Name five advantages and five disadvantages for using narcotics to control pain.
13. Name five narcotics commonly used to control pain.
14. Name two other uses for narcotics besides their use as analgesics.
15. Explain why methadone is used in the treatment of narcotic addiction.
16. Name four other groups of CNS depressants that should be used with caution while taking narcotics.
17. Name two effects that an overdose on narcotics can have on the individual and name the drug of choice for the treatment of an overdose.
18. Describe methods utilized to control dental pain on a patient who is addicted to narcotics but who is trying to control their addiction.
19. Describe seven methods of detecting a narcotic addict who might be using dental treatment as a method to obtain narcotics.
20. Describe the type of pain normally controlled by peripheral acting analgesics and name four general characteristics of this group of analgesics.
21. Name the three general groups of peripheral acting analgesics.
22. Name five general activities of the analgesic Acetaminophen and one precaution when prescribing this drug.
23. Name two trade names for acetaminophen.
24. Define what is meant by the term non-steroidal, anti-inflammatory drug (NSAID).

25. Compare the drug activities and side effects of aspirin and NSAIDs.
26. Compare the side effects and toxicity of aspirin, NSAIDs and Acetaminophen.
27. Give three advantages to using combinations of peripheral and centrally acting analgesics and name three such combinations of drugs.

I. Unit XIV: Treatment of Oral Lesions

1. Know the diagnostic differences between HSV type I and ANUG.
2. Know treatment for both HSV and ANUG.
3. Give 2 forms of infection with HSV-1.
4. Know the causes of candidiasis, its diagnosis and treatment.
5. Know treatment and causes of angular cheilitis.
6. Know causes, treatment and associated factors for osteitis.
7. Know the causes, location and treatment for aphthous ulcers.
8. Know the cause, appearance, treatment and potential of lichen planus.
9. Know the appearance of benign migratory glossitis.
10. Know the causes of glossodynia.
11. Know the drugs that cause xerostomia, lichenoid, drug eruption, gingival enlargement and hyperpigmentation.

J. Unit XV - XVI: Chemotherapeutic Therapy

1. Explain what is meant by a chemotherapeutic agent; tell where the two main groups of chemotherapeutic agents originate and give the general name for each group.
2. Describe what is meant by selective toxicity and partial or selective toxicity when referring to chemotherapeutic agents.
3. Explain the relationship between the therapeutic index (TI) and selective toxicity when describing the activities of chemotherapeutic agents.
4. Name six different ways chemotherapeutic agents can have a therapeutic effect on infectious agents.
5. Name three types of antiviral agents that are used in the treatment of viral diseases and name three groups of agents used in the treatment of HIV infection.
6. Explain what meant by broad and narrow spectrum when referring to the spectrum of activity of antibiotics.
7. Compare and contrast the bactericidal and bacteriostatic effects of antibiotics and explain how these characteristics effect the choice of agents used in treatment of infections.
8. Explain what is meant by the following terms: inherent & acquired resistance; and culture and sensitivity testing.
9. Describe what is the difference between prescribing antibiotics for therapeutic and prophylactic treatment.
10. Define the following terms and describe how these factors affect antibiotic usage: superinfection; hypersensitivity and cross allergies; drug interactions; and the effect of antibiotics on commensals.
11. Describe considerations that must be made when prescribing chemotherapeutic agents for pregnant woman.
12. Compare and contrast the advantages and disadvantage to oral, parenteral, and topical methods of administering antibiotics.
13. Describe penicillin as to: mode of action, allergic reactions, toxic reactions, and affect it has on the normal oral biota.
14. Explain why penicillin is the drug of choice for most oral infections.
15. Name the four basic types of penicillin and when they are indicated, and give an example of each type.
16. Name five medical conditions where antibiotic premedication is indicated before invasive dental treatment is performed.
17. Describe the standard regimen for prophylactic antibiotic premedication for dental treatment of patients with certain medical conditions.
18. Name the prophylactic antibiotic of choice for premedication for dental treatment when

the patient is allergic to penicillin.

19. Describe the mode of action, bacterial spectrum, indications for use, & toxic reactions for: erythromycin, tetracycline, bacitracin, and nystatin.
20. Name the antibiotics most commonly utilized in the treatment of Tuberculosis and explain why it is necessary to utilize more than one antibiotic.

K. Unit XVII: Autocoids and Antihistamines

1. List 5 different autocoids.
2. List the pharmacologic effects of histamine and whether they are H1 or H2 effects.
3. List 3 H2 antagonists and tell what they are used for.
4. Know pharmacologic effects of the H1 antagonists.
5. Know the physiology of and symptoms of anaphylaxis. Know the treatment.
6. Know the CNS, Anticholinergic, Anti-emetic and local anesthetic effects of H1 Antagonists.
7. Know the variety of uses for H1 antagonists.
8. List 3 nonsedating antihistamines used to treat allergies OTC.
9. Know the dental implications of prostaglandins and thromboxanes.

L. Unit XVIII: Antianxiety Drugs

1. Describe what is meant by an anti-anxiety drug.
2. Name seven traits anti-anxiety drugs have in common.
3. Describe what effects increasing the dose of an anti-anxiety drugs has on patients.
4. Name the two major classes of anti-anxiety drugs.
5. List four characteristics of sedative/hypnotic drugs.
6. Name four types of anti-anxiety drugs.
7. Describe, in general terms, the therapeutic effects, general characteristics, and cause of death from an overdose of barbiturates.
8. Describe the therapeutic uses and trade name for the barbiturates, phenobarbital and pentobarbital.
9. Describe what is meant by redistribution of a drug and the role this plays in the action of thiopental.
10. Name a skeletal relaxant and state main use of skeletal relaxants in dental treatment.
11. Explain why the antihistamines Benadryl and promethazine can be used as sedative/hypnotics.
12. Name what group of minor tranquilizers are used as sedative/hypnotics and give three examples from this group.
13. Compare Valium to barbiturates for safety.
14. Describe what is meant by the amnestic response of Valium.
15. Name four disadvantages and four anti-cholinergic effects of the Benzodiazepines.
16. Explain why Xanax should not be used for periods of more than two weeks.
17. Name two dental uses for antianxiety drugs and four side effects the patient will experience while taking these medications.

L. Unit XIX: Hormones

1. List the 7 endocrine glands and their function.
2. Know which glands are controlled by the pituitary, how it's done and what hormones (precursors) originate in which parts of the pituitary.
   List symptoms of pituitary hypo and hyper function.
3. Differentiate between the signs and symptoms of hypo and hyper thyroidism.
4. Give 2 uses for the vasopressins.
5. Know the dental effects of hypothyroidism and hyperthyroidism.
6. Know meds used to treat thyroid conditions.
8. Know both types of diabetes mellitus, age of onset, pathophysiology and treatment.
7. Learn to recognize the causes and treatment of hypoglycemic reactions.
8. Know the oral hypoglycemics (Brand names).

9. List the side effects of birth control pills.
10. List 4 drugs with which they interact and characterize the interaction.
11. Know management of the dental patient taking oral contraceptives.
12. What effects do androgens have on the developing organism.

M. Unit XX: Antineoplastic Agents

1. Discuss the 3 modalities for cancer treatment. Are they sometimes used in combination?
2. Which cancers show the least activity with antineoplastic agents.
3. Discuss the mechanism of action of antineoplastic agents.
4. Which 2 classifications are used for antineoplastic agents.
5. Discuss the oral effects of antineoplastic agents, and oral care of a patient taking antineoplastic agents.

N. Unit XXI: Respiratory and Gastrointestinal Drugs

1. Discuss the respiratory diseases Asthma, Status Asthmaticus and COPD and their treatment.
2. Discuss the groups of drugs used and treat pulmonary disorders and their mechanisms of action.
3. Discuss agents used for upper respiratory infections.
4. Discuss the familiar gastrointestinal disorders.
5. Discuss the drugs used to treat gastrointestinal disorders.
6. Give four types of laxatives. Which is safest.
7. Know your antidiarrheals. Emetics and antiemetics.
8. Discuss treatment of inflammatory bowel dz. Unit XXII:

O. Unit XXII Pregnancy and Breast Feeding

1. Discuss the trimesters with respect to safe dental treatment.
2. Know the FDA pregnancy categories.
3. Discuss the effect on the fetus of the most commonly used dental drugs.
4. Discuss the methods of minimizing emergencies in the dental office and the treatment of an emergency in the dental office.

P. Drug-related Emergencies

1. Discuss hypoglycemia its treatment and the treatment of respiratory emergencies.
2. Discuss the signs, symptoms and treatment of cardiovascular emergencies.
3. Discuss the signs, symptoms and treatment of extrapyramidal reactions, and adrenal insufficiency thyroid storm and malignant hyperthermia.
4. Be able to diagnose and treat drug related emergencies (i.e., local anesthetic and opioid).

Q. XXIII – Drug Interactions and Drug Abuse

1. Define a drug interaction.
2. Discuss situation to be encountered in practice.
3. Know the 2 methods of interaction.
4. Know the groupings of drug interactions.
5. Be familiar with the more common interactions for Aspirin, NSAID's. Opioids, Anti-infectives, epinephrine, and the "Red Flag Drugs" (see Table 25-8).
6. For Drug abuse see objective A, item #12.

III. THECB Learning Outcomes (WECM)

1. Differentiate the classification of drugs.
2. Identify the uses, actions, and contraindications of drugs; and recognize systemic and oral manifestations associated with their use.

IV. Evaluation

A. Examinations

A total of five (5) examinations will be given during the semester. Each one will be comprehensive. The Final will be a comprehensive examination. Each exam will represent 1/5 of grade. There will be no make-up exams for a missed exam.

B. Grading Scale

A = 93 - 100
B = 83 - 92
C = 75 - 82
F = 74 and below

In the event a grade is borderline, class attendance and participation will be considered in the final computation. NOTE TO THE STUDENTS: A grade of "C" or better is required in order to meet the standards for Dental Hygiene.

V. Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.