HES 128

Pharmacology and Dosage Calculations
for
Allied Health Occupations

Presented and Approved
January 12, 2012

Effective Fall 2012-13
Pharmacology and Dosage Calculations: for Allied Health Occupations

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>HES 128</th>
<th>Course Title: Pharmacology and Dosage Calculations: for Allied Health Occupations</th>
</tr>
</thead>
</table>

Purpose of this submission: [ ] New  [x] Change/Updated  [ ] Retire

If this is a change, what is being changed? (Check all that apply)
- Change Name and add textbook.
- Update Prefix
- [ ] Course Description
- [ ] Title
- [ ] Course Number
- [ ] Format Change
- [ ] Credits
- [ ] Prerequisite
- [ ] Competencies
- Textbook/Reviewed Competencies-no changes needed

Does this course require additional fees?  [ ] No  [ ] Yes  If so, please explain.

Is there a similar course in the course bank?  [x] No  [ ] Yes (Please identify)

Articulation: Is this course or an equivalent offered at other two and four-year universities in Arizona?  [ ] No  [ ] Yes (Identify the college, subject, prefix, number and title)

Is this course identified as a Writing Across the Curriculum course?  [x] No  [ ] Yes

Course Textbook, Materials and Equipment

<table>
<thead>
<tr>
<th>Textbook(s)</th>
<th>Title</th>
<th>Essentials of Pharmacology for Health Occupations 5th edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author(s)</td>
<td>Ruth Woodrow</td>
<td></td>
</tr>
<tr>
<td>Publisher</td>
<td>Delmar</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title</th>
<th>Dosage Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author(s)</td>
<td>Gloria D Pickar</td>
</tr>
<tr>
<td>Publisher</td>
<td>Delmar</td>
</tr>
</tbody>
</table>

Software/Equipment

Course Assessments

| Description of Possible Course Assessments (Essays, multiple choice, etc.) | Frequent quizzes and/or exams are highly encouraged to assess the student’s comprehension. Quizzes and exams may be given in any format, while keeping in mind that the board exam is in a multiple choice format. Student oral presentations on selected material are also encouraged to assess the student's ability to orally express themselves clearly and accurately. Oral presentations are also encouraged to allow the student the opportunity to become a confident speaker. |

Exams standardized for this course?  [ ] Midterm  [ ] Final  [ ] Other (Please specify):  [ ] Yes  [ ] No

Are exams required by the department?  [ ] No  [ ] Yes

If Yes, please specify:

Where can faculty members locate or access the required standardized materials?  Instructors may write their own quizzes and/or exams.
Student Outcomes: Identify the general education goals for student learning that is a component of this course.

<table>
<thead>
<tr>
<th>Check all that apply:</th>
<th>Method of Assessment</th>
</tr>
</thead>
</table>
| 1. Communicate effectively.  
  a. Read and comprehend at a college level. ✔️  
  b. Write effectively in a college setting. ✔️ | Quizzes, exams, discussions and presentations of material, drug cards |
| 2. Demonstrate effective quantitative reasoning and problem solving skills.  
  ✔️ | Dosage calculations, and conversions |
| 3. Demonstrate effective qualitative reasoning skills. ❏ | Dosage calculations, and conversions |
| 4. Apply effective methods of inquiry.  
  a. Generate research paper by gathering information from varied sources, analyzing data and organizing information into a coherent structure. ❏  
  b. Employ the scientific method. ❏ | Drug card research |
| 5. Demonstrate sensitivity to diversity  
  a. Experience the creative products of humanity. ❏  
  b. Describe alternate historical, cultural, global perspectives. ❏ |  

Office of Instruction Use only:

CIP Code: 

ONET Code: 

Minimum Qualifications:
COURSE INFORMATION

Initiator: Lori Hogue, Carol Elledge, Lori Howell
Date of proposal to Curriculum Sub-Committee: January 2012
Effective Semester/Year          Fall 2012  Spring  Summer
Prefix & Number: HES 128          Full Title: (100 character limit)

Pharmacology and Dosage Calculations for Allied Health Occupations
Short Title: (30 character limit)

Catalog Course Description: Introduction of pharmacology to include common drug classifications, actions, uses, and side effects of pharmacological agents. Accurate calculation of dosage, and conversions, legal and safety considerations, as well as patient care implications will be emphasized.

SUN  Course Number:
Credit Hours: 3.0  Lecture Hours: 3.0  Lab Hours: 0.0

Prerequisite(s)  Appropriate score on assessment test or successful completion of the PCS 021, TRE 089 and TRM 090
Co-requisite(s)

Intended Course Goals

By the end of the semester, students will be able to:

1. Analyze the basics of pharmacology, including drug sources and uses.

2. Accurately calculate dosages as required, including appropriate conversions.

3. Describe the general classifications of pharmaceuticals, including commonly used drugs in each category, including the drug’s purpose, side effects, cautions and interactions.

4. Discuss the general information that should be conveyed to the patient about each category, and demonstrate appropriate patient education techniques.

5. Identify the six “rights” to proper medication administration.
# Course Competencies and Objectives

**By the end of the semester, students will be able to:**

<table>
<thead>
<tr>
<th>Competency 1</th>
<th>Describe and analyze the scope of practice of the allied health provider with pharmaceuticals, including the governing agencies (DEA, FDA) that regulate pharmaceuticals in the United States.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 1.1</strong></td>
<td>Define “drug standards” and explain why it is important to have them.</td>
</tr>
<tr>
<td><strong>Objective 1.2</strong></td>
<td>List the provisions of the Federal Food, Drug, and Cosmetic Act of 1938, and identify the government agency that enforces the act.</td>
</tr>
<tr>
<td><strong>Objective 1.3</strong></td>
<td>List the provisions of the Controlled Substances Act of 1970.</td>
</tr>
<tr>
<td><strong>Objective 1.4</strong></td>
<td>Define schedules of controlled substances, and differentiate between C-I to C-V schedules.</td>
</tr>
<tr>
<td><strong>Objective 1.5</strong></td>
<td>State several responsibilities you have in dispensing of medications, as a direct result of the three major drug laws.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competency 2</th>
<th>List the basic categories of pharmaceuticals and the terms used to describe their actions; and identify reliable professional sources of information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 2.1</strong></td>
<td>Compare and contrast, generic name, official name, trade name, and chemical name.</td>
</tr>
<tr>
<td><strong>Objective 2.2</strong></td>
<td>Describe what is indicated by a number included in a drug trade name.</td>
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<tr>
<td><strong>Objective 2.3</strong></td>
<td>List two drug references available today and discuss several characteristics you consider important in choosing the best one.</td>
</tr>
<tr>
<td><strong>Objective 2.4</strong></td>
<td>Describe the types of information listed on drug cards and why you should use them.</td>
</tr>
<tr>
<td><strong>Objective 2.5</strong></td>
<td>Compare and contrast the ototoxicity, nephrotoxicity and photosensitivity of the common categories of drug.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Competency 3</th>
<th>Describe and analyze the systemic and local physiological changes that are intended by the administration of drugs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 3.1</strong></td>
<td>List the four sources of drugs.</td>
</tr>
<tr>
<td><strong>Objective 3.2</strong></td>
<td>Compare and contrast systemic effects and local effects, loading dose and maintenance dose, and toxic dose and lethal dose.</td>
</tr>
<tr>
<td><strong>Objective 3.3</strong></td>
<td>List the processes of absorption, distribution, metabolism, and excretion as they relate to the passage of drugs through the body.</td>
</tr>
<tr>
<td><strong>Objective 3.4</strong></td>
<td>List several variables that may affect the action of drugs.</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Competency 4</th>
<th>Describe the physical forms that are commonly used for pharmaceuticals and analyze their impact upon the routes of delivery and means of absorption.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 4.1</strong></td>
<td>Compare and contrast sublingual tablet and buccal tablet, solution and suspension, syrup and elixir, enteric-coated tablet and scored tablet, and timed-release capsule and lozenge.</td>
</tr>
<tr>
<td><strong>Objective 4.2</strong></td>
<td>List four classifications of drugs that are commonly given by the rectal route and at least 8 drug forms used for topical administration.</td>
</tr>
<tr>
<td><strong>Objective 4.3</strong></td>
<td>Define the following types of injections and explain how they differ in administration and absorption rate; IV, IM, and ID.</td>
</tr>
<tr>
<td><strong>Objective 4.5</strong></td>
<td>List various supplies used in the preparation of medications.</td>
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<thead>
<tr>
<th>Competency 5</th>
<th>List and describe common abbreviations and symbols used for medication orders.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 5.1</strong></td>
<td>List the six parts of medication order and the two additional items required on a prescription blank.</td>
</tr>
<tr>
<td><strong>Objective 5.2</strong></td>
<td>Compare and contrast the three systems of measurement.</td>
</tr>
<tr>
<td><strong>Objective 5.3</strong></td>
<td>Demonstrate how to convert dosages from one system to another by use of the...</td>
</tr>
</tbody>
</table>
| Competency 6 | Demonstrate the basic steps used to convert drugs from their bulk form into an appropriate unit-dose form as ordered by a physician.  
Objective 6.1 List the three steps for calculations of the dosage ordered when it differs from the dosage on hand.  
Objective 6.2 Demonstrate how to calculate dosage using the basic calculation method and the ratio and proportion method.  
Objective 6.3 Describe how to solve dosage problems using both the basic calculation method and the ratio and proportion method and list the cautions of both.  
Objective 6.4 Demonstrate how to calculate safe dosages for infants, children and geriatric patients.  
Objective 6.5 List steps to reduce medication errors. |
|---------|-------------------------------------------------|
| Competency 7 | Describe and analyze the responsibilities of the health care provider in safe administration of medications.  
Objective 7.1 List the six Rights of Medication Administration.  
Objective 7.2 List moral, ethical, and legal rights and responsibilities of the health care worker regarding medication errors and in refusing to administer medications. |
| Competency 8 | Compare and contrast administering medications orally, by nasogastric or gastrostomy tube and rectally and analyze the absorption process methods.  
Objective 8.1 Define NPO and demonstrate appropriate action when patient is NPO, had dysphagia, refused medication, vomits medication, or has allergies.  
Objective 8.2 List special precautions in preparation of timed-released capsules, entericcoated tablets, and oral suspensions. |
| Competency 9 | Describe the four parenteral routes of delivery including their systemic and local effects  
Objective 9.1 Explain administration via the sublingual and buccal routes, including instructions to the patient.  
Objective 9.2 Demonstrate application of nitroglycerin ointment and the transdermal patch.  
Objective 9.3 Identify three conditions treated with transcutaneous delivery systems.  
Objective 9.4 Compare and contrast advantages and disadvantages of inhalation therapy.  
Objective 9.5 List cautions when administering IPPB therapy.  
Objective 9.6 List the three parts of the syringe and the three parts of the needle.  
Objective 9.7 Demonstrate drawing up medications from a vial and an ampule.  
Objective 9.8 Describe and demonstrate an intradermal and a subcutaneous injection.  
Objective 9.9 Describe five sites for intramuscular injection and demonstrate intramuscular injection. |
| Competency 10 | List and describe the characteristics that constitute a poison and discuss basic first aid procedures and antidotes.  
Objective 10.1 List and describe four routes by which poisons may be taken into the body.  
Objective 10.2 List five conditions in which vomiting, after the ingestion of poisons, could be injurious to the patient.  
Objective 10.3 Describe the first step to take in the event of any poisoning and the procedure to follow.  
Objective 10.4 Explain the purpose of activated charcoal and when it is given.  
Objective 10.5 List three clinical procedures required when caring for patients who have been poisoned.  
Objective 10.6 Describe appropriate therapy for poisoning by inhalation, external poison, and insect sting. |
Objective 10.7 Identify two groups of people at risk for poisoning.
Objective 10.8 List 10 recommendations for patient education to help prevent poisoning.
Objective 10.9 Describe the process for contacting the local and/or national poison control center.

Competency 11 Describe the role and importance of vitamins and minerals for the maintenance of good health and proper nutrition.
  Objective 11.1 List vitamins and their sources, function, signs of deficiency, and symptoms of overdose if known.
  Objective 11.2 List minerals and their sources, function and signs of deficiency.
  Objective 11.3 Describe conditions that may require vitamin and/or mineral supplements.
  Objective 11.4 Explain the role of antioxidants in nutrition therapy.
  Objective 11.5 Describe why and how consumers should be more vigilant in the use of herbal products.
  Objective 11.6 List and describe the sources of reliable information regarding the appropriate use of vitamins and minerals in the United States.

Competency 12 Discuss the types of conditions and discomforts that can affect the skin, and describe the common topical medications used to relieve these conditions.
  Objective 12.1 Describe application procedures for various skin medications.
  Objective 12.2 List and describe side effects of the seven major categories of skin medications and contraindications when appropriate.
  Objective 12.3 Compare and contrast scabicides and pediculicides.
  Objective 12.4 List five possible side effects of long-term topical corticosteroid therapy and their contraindications.
  Objective 12.5 Describe contraindications for the use of the major categories of skin medications.

Competency 13 Describe the basic functions of the sympathetic and parasympathetic divisions of the autonomic nervous system; analyze the general characteristics of the four categories of the pharmaceuticals used for treatment.
  Objective 13.1 Identify the actions, uses, side effects, and contraindications of adrenergics, adrenergic blockers, cholinergics and cholinergic blockers.
  Objective 13.2 List the most key drugs in each category and describe their purpose, administration method and possible side effects.
  Objective 13.3 Discuss the patient education requirements that should accompany the administration of autonomic nervous system drugs, cholinergics and cholinergic blockers.

Competency 14 Describe and analyze the use of chemotherapy in conjunction with surgery and radiation to counteract the development, growth, or spread of malignant cells.
  Objective 14.1 List three characteristics associated with administration of antineoplastic drugs
  Objective 14.2 List the eight major groups of antineoplastic agents and describe their common side effects.
  Objective 14.3 Describe appropriate interventions in caring for patients receiving antineoplastic agents.
  Objective 14.4 List and describe the precautions that should be used when caring for patients receiving radioactive isotopes and/or chemotherapy.
  Objective 14.5 Discuss the patient education requirements that should accompany the administration of antineoplastic.
  Objective 14.6 Analyze the potential health hazardous for the health care provider when administering cytotoxic drugs.
Objective 14.7 List safety factors for those who care for patients receiving cytotoxic drugs.

Competency 15 Describe the use of diuretics for the treatment of urinary system disorders and to increase urine excretion.
  Objective 15.1 Compare and contrast thiazides, loop, potassium-sparing, and osmotic agents including their uses, side effects, contraindications, and interactions.
  Objective 15.2 Describe two of the interactions that can accompany the use of probenecid (Benemid) with other medications.
  Objective 15.3 Describe the types of medications given for chronic gout.
  Objective 15.4 Discuss the purpose of antispasmodics in reducing contractions of the urinary bladder.
  Objective 15.5 Describe two different treatments for benign prostatic hypertrophy (BPH).
  Objective 15.6 Discuss the patient education requirements that should accompany the administration of diuretics drugs.

Competency 16 Discuss the use of gastrointestinal drugs for the treatment of ulcers, inflammatory bowel disease, diarrhea and other gastrointestinal diseases and conditions.
  Objective 16.1 Describe the uses, side effects, contraindications, and interactions of antacids, antiulcer agents, antidiarrheal agents, antiflatulents, cathartics and laxatives, and antiemetic’s.
  Objective 16.2 Compare and contrast the five types of laxatives according to use, side effects, contraindications, and interactions.
  Objective 16.3 List and describe the most common examples from each of the eight categories of gastrointestinal drugs and explain important patient education for each.
  Objective 16.3 Discuss the patient education requirements that should accompany the administration of gastrointestinal drugs.

Competency 17 Describe and analyze the use of anti-infective drugs in the treatment of stigmatic infection, and compare and contrast the differences in their primary modes of action.
  Objective 17.1 List the potential side effects, contraindications, and interactions that are common to each category of anti-infectives.
  Objective 17.2 Discuss the importance of culture and sensitivity testing to the identification and successful treatment of infections.
  Objective 17.3 Describe the impact of the patient’s status of hepatic and renal function, age, pregnancy status, level of resistance, and allergies upon the appropriate selection of a particular anti-infective drug for successful treatment.
  Objective 17.4 Discuss the patient education requirements and considerations that should accompany the administration of anti-infective drugs.
  Objective 17.5 Describe and analyze the impact of the overuse of anti-infective upon the body’s immune system and resistance to future infections.

Competency 18 Discuss the use of eye medications in the treatment of eye discomfort and diseases; and discuss their use in surgical procedures.
  Objective 18.1 Demonstrate the administration technique for instillation of ophthalmic medications to reduce systemic absorption.
  Objective 18.2 List the five categories of ophthalmic medication.
  Objective 18.3 List side effects, contraindications, and interactions for each category of ophthalmic medication.
  Objective 18.4 Discuss the patient education requirements that should accompany the administration of ophthalmic medications.

Competency 19 Describe and analyze the primary therapeutic benefits of using analgesics, sedatives and hypnotics.
  Objective 19.1 Compare and contrast the purposes and actions of non-opioid, opioid, and
Objective 19.2 Describe the contraindications to administration of the CNS depressants.
Objective 19.3 Categorize the most commonly used psychotropic medications according to the following four classifications: CNS stimulants, antidepressants, anxiolytics, and antipsychotic medications.
Objective 19.4 Describe the physiological effects of prolonged alcohol use.
Objective 19.5 Compare and contrast drug addiction and habituation.
Objective 19.6 Describe the effects of three commonly used illegal drugs.
Objective 19.7 List the responsibilities of the health care worker in combating drug abuse.
Objective 19.8 Discuss the patient education requirements that should accompany the administration of analgesics, sedatives and hypnotics.

Competency 20 Describe the use of skeletal muscle relaxants and non-steroidal anti-inflammatory drugs in the treatment of musculoskeletal disorders.
Objective 20.1 List the commonly used skeletal muscle relaxants and describe the side effects to be expected.
Objective 20.2 List and describe the drugs that can interact with the muscle relaxants and cause serious potentiation of effect.
Objective 20.3 Compare and contrast anti-inflammatory and anti-rheumatic drugs, used to treat an acute episode of gout.
Objective 20.4 List and describe the potential side effects, and drug interactions with NSAIDs.
Objective 20.5 Discuss the use of medications for osteoporosis therapy.
Objective 20.6 Compare and contrast COX-2 inhibitors and other NSAIDs.
Objective 20.7 Discuss the patient education requirements that should accompany the administration of skeletal muscle and anti-inflammatory drugs.

Competency 21 Describe the kinds of medications that are used to treat convulsions, Parkinson’s, and Alzheimer’s disease and their impact upon older adults.
Objective 21.1 Describe the common disorders and side effects associated with seizures.
Objective 21.2 List and describe the medications used for each type of epilepsy and their common side effects.
Objective 21.3 List and describe the drug therapies commonly used for the treatment of Parkinson’s and discuss their potential side effects.
Objective 21.4 List and describe the drug therapies commonly used for the treatment of Alzheimer’s disease.
Objective 21.5 List the most commonly used drugs that may be inappropriate for use with older adults.
Objective 21.6 Describe four factors that may contribute to a cumulative adverse effect in older adults.
Objective 21.7 List at least five categories of drugs that frequently cause adverse side effects in older adults.
Objective 21.8 List at least ten drugs that can cause mental problems in older adults.

Competency 22 Describe the use of endocrine and reproductive system medications for the appropriate treatment of conditions and disease; and analyze their curative or supportive benefits.
Objective 22.1 List and describe the hormones secreted by these four endocrine glands: pituitary, adrenals, thyroid, and islets of Langerhans.
Objective 22.2 Identify conditions that can be treated with corticosteroids.
Objective 22.3 List and describe the potential side effects of long-term steroid therapy.
Objective 22.4 Compare and contrast the medications prescribed for hypothyroidism and hyperthyroidism.
<table>
<thead>
<tr>
<th>Objective 22.5</th>
<th>Compare and contrast the use of insulin's based upon their action naming onset, peak, and duration.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective 22.6</td>
<td>Discuss the common symptoms of hypoglycemia and hyperglycemia, and describe the appropriate interventions for each.</td>
</tr>
<tr>
<td>Objective 22.7</td>
<td>List the uses, side effects, and precautions for androgens.</td>
</tr>
<tr>
<td>Objective 22.8</td>
<td>Compare and contrast alternative contraceptive medications and describe the potential side effects of each.</td>
</tr>
<tr>
<td>Objective 22.9</td>
<td>Describe the use of oxytocic's and the precautions to be observed.</td>
</tr>
<tr>
<td>Objective 22.10</td>
<td>List the uses of Prostaglandin and magnesium sulfate.</td>
</tr>
<tr>
<td>Objective 22.11</td>
<td>Describe drug therapies that can be used for infertility and impotence.</td>
</tr>
<tr>
<td>Objective 22.12</td>
<td>Discuss the patient education requirements that should accompany the administration of endocrine or reproductive system related drugs and therapies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competency 23</th>
<th>Describe the use of cardiovascular and respiratory medications for the appropriate treatment of conditions and disease; and analyze their curative or supportive benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective 23.1</td>
<td>Describe the use of digitalis in treating heart disease and list the potential toxic side effects.</td>
</tr>
<tr>
<td>Objective 23.2</td>
<td>Describe the intended therapeutic action of the antiarrhythmics and list the potential side effects.</td>
</tr>
<tr>
<td>Objective 23.3</td>
<td>Describe the most common prescribed antihypertensives, and their common side effects and contraindications.</td>
</tr>
<tr>
<td>Objective 23.4</td>
<td>Describe the most common coronary vasodilators and list their common side effects and contraindications.</td>
</tr>
<tr>
<td>Objective 23.5</td>
<td>Identify five antilipemic agents and describe their use.</td>
</tr>
<tr>
<td>Objective 23.6</td>
<td>Compare and contrast heparin and coumarin derivatives in terms of administration, action, and antidotes.</td>
</tr>
<tr>
<td>Objective 23.7</td>
<td>Describe the purpose of carbon dioxide inhalation therapy.</td>
</tr>
<tr>
<td>Objective 23.8</td>
<td>Describe the uses of and the precautions necessary when administering oxygen therapy.</td>
</tr>
<tr>
<td>Objective 23.9</td>
<td>List the uses, side effects, and contraindications for bronchodilators, antitussives, antihistamines and decongestants.</td>
</tr>
<tr>
<td>Objective 23.10</td>
<td>Discuss the patient education requirements that should accompany the administration of cardiovascular and respiratory related drugs and therapies.</td>
</tr>
</tbody>
</table>