



# **INSTRUCTIONAL PACKAGE**

RES 246  
Respiratory Pharmacology

Effective Term  
Fall 2023

# INSTRUCTIONAL PACKAGE

## Part I: Course Information

Effective Term: Fall 2023/Spring 2024/Summer 2024

COURSE PREFIX: RES 246

COURSE TITLE: Respiratory Pharmacology

CONTACT HOURS: 2

CREDIT HOURS: 2

### **RATIONALE FOR THE COURSE:**

Respiratory Pharmacology is a foundational course for respiratory care and an important part of the curriculum. In RES 246, you will gain knowledge of the pharmacologic drugs used in the respiratory care field, the basics of pharmacology, and the different drugs used to treat patients with respiratory care disorders.

### **COURSE DESCRIPTION:**

This course includes a study of pharmacologic agents used in cardiopulmonary care.

### **PREREQUISITES/CO-REQUISITES:**

Admission to the Respiratory Care Program.

### **REQUIRED MATERIALS:**

Please visit the [BOOKSTORE](#) online site for most current textbook information.

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

Bills, G. and Rose, C. (2019). Principals of Pharmacology for Respiratory Care. (3<sup>rd</sup> Ed). Burlington, Mass: ISBN 9781284139792. Jones and Bartlett Learning

### **TECHNICAL REQUIREMENTS:**

Access to Desire2Learn (D2L), HGTC's learning management system (LMS) used for course materials.

Access to myHGTC portal for student self-services.

College email access – this is the college's primary official form of communication.

### **CLASSROOM ETIQUETTE:**

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

**NETIQUETTE:** is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit [Online Netiquette](#).

## Part II: Student Learning Outcomes

1. Identify pharmacologic terms and drug sources.
2. Discuss the phases of drug action.
3. Perform drug calculations related to respiratory care.
4. Discuss cardiovascular drugs related to respiratory care.
5. Discuss sedatives, analgesics and respiratory stimulants.
6. Discuss Corticosteroids, Antimicrobials and other miscellaneous drugs related to respiratory care.

### COURSE LEARNING OUTCOMES and ASSESSMENTS\*:

Module 1

Material Covered

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Assessments:

Homework/Quizzes/Case Study/Test

Learning Outcomes:

1. Describe a drug's trade name, generic name, therapeutic dose, therapeutic effect, and side effects; and determine whether it is a teratogen or carcinogen, when provided with the drug's information.
2. Describe the four phases of drug development.
3. Describe some aspects of governmental control of abuse of prescription drugs and review the five schedules of drugs as defined by the Federal Comprehensive Drug Abuse Prevention and Control Act of 1970.
4. List the sources from where detailed and up-to-date information about drugs can be obtained
5. Define pharmacology and describe several disciplines within the area of pharmacologic study.
6. Compare and contrast the different routes of medication administration.
7. Predict the action or effect of a receptor agonist and antagonist.
8. Explain how lipid solubility and ionization affect absorption of medications.
9. Identify the patient factors that may alter drug effects.
10. Describe the process of drug metabolism and excretion and list the most common organs responsible for each
11. Describe the overall function and differences among the somatic nervous system, the sympathetic

division, and the parasympathetic division of the autonomic nervous system.

12. Explain the function of neurotransmitters.
13. Compare and contrast the sites of action, neurotransmitters at the ganglion site, and neuroeffector sites of the somatic, the sympathetic, and the parasympathetic nervous systems.
14. List the characteristic physiologic functions that are controlled by the sympathetic and parasympathetic divisions.
15. If given an adrenergic agonist drug and the receptors it acts on, be able to predict its effects on the blood vessels, heart, and lungs.
16. Summarize the mechanism of action, clinical effects, and adverse reactions expected to be seen with  $\alpha$ -blocking and  $\beta$ -blocking drugs.
17. List the names of the parasympathetic receptors and the organ function affected by each.
18. Explain in which clinical situations you would use an anticholinergic agent and what clinical and toxic affects you would expect to see
19. Define key terms pertaining to calculating drug doses
20. Use the metric system
21. Calculate drug doses using proportions and percent-strength solutions.

## Module 2

### Material Covered

Chapter 5

Chapter 6

Chapter 7

Chapter 8

### Assessments:

Homework/Quizzes/Case Study/Test

### Learning Outcomes:

1. Discuss the characteristics of an aerosol solution that leads to more effective drug delivery into the lung tissue.
2. List the advantages and disadvantages of drug administration by the aerosol route.
3. Describe the equipment used for aerosol administration of drugs by small-volume nebulizer.
4. Describe patient instructions for taking an effective SVN treatment.
5. Describe the purpose of a spacer or valved holding chamber device for aerosol administration.
6. Describe patient instructions for taking an effective dose of medication by MDI.
7. Describe the use of SVN and MDI aerosol medications during continuous mechanical ventilation.
8. List the drugs that are currently administered by powder aerosol (dry powder inhaler), including the devices used for this administration.
9. List the indications (or clinical settings) for drug administration by instillation and the disadvantages or hazards of drug administration by instillation.
10. Compare and contrast nebulizers, MDI, and dry powder inhalers for aerosol drug delivery.
11. Compare and contrast bronchoconstriction and bronchospasm.
12. List the three categories of bronchodilators and describe the mechanism of how each class causes bronchodilation.
13. Describe the common adverse effects and contraindications of sympathomimetic, anticholinergic, and methylxanthine bronchodilators.
14. List the common drugs that interact with sympathomimetic, anticholinergic, and methylxanthine

bronchodilators and predict the potential effect of using the drugs concomitantly.

15. Compare the use of adrenergic, anticholinergic, and methylxanthine bronchodilators in clinical practice.
16. Assess the clinical indications for short-acting and long-acting inhaled bronchodilators.
17. Describe mucosal edema and how it relates to difficulty breathing or respiratory distress.
18. List the clinical conditions or diseases that may lead to bronchoconstriction caused by mucosal edema and therapies used for the treatment.
19. Describe the pathophysiology of asthma and the rationale for using corticosteroid therapy for control of asthmatic symptoms.
20. Describe the mechanism of action of corticosteroids used in the treatment of airway inflammation.
21. List the brand and generic names of inhaled corticosteroids used in the treatment of airway inflammation as well as its adverse effects and contraindications.
22. Describe the mechanism of action of leukotriene inhibitors and antagonists.
23. Distinguish between controlled and uncontrolled asthmatic patients and determine who would benefit most from the use of a monoclonal antibody.
24. Define the terms bland aerosol, mucoactive, mucolytic, mucokinetic, and expectorant.
25. Discuss the therapeutic indications for the use of bland aerosols and mucolytic agents in airway maintenance.
26. Compare and contrast the two primary mucolytic aerosols.
27. Describe the proposed mechanisms of action, contraindications, and hazards of each mucolytic agent.
28. Describe the use of sodium bicarbonate as an expectorant or thinning agent.

### Module 3

#### Material Covered

#### Chapter 9

#### Chapter 10

#### Chapter 11

#### Chapter 12

#### Assessments:

#### Homework/Quizzes/Case Study/Test

#### Learning Outcomes:

1. Define surface tension and describe the clinical importance of surface tension as it relates to the work of breathing.
2. Describe the physiologic purpose of pulmonary surfactant.
3. Describe clinical indications for the use of surfactant replacement drugs.
4. Compare and contrast the three surfactant replacement drugs currently in use in the United States with relation to:
  - a. brand names
  - b. indications
  - c. contraindications
  - d. side effects/adverse reactions
  - e. dosage and route of administration
5. List the most common indications for the use of aerosolized antimicrobial agents.
6. Discuss the disadvantages or limitations of aerosol administration of antimicrobial drugs.

7. Name the FDA-approved aerosolized antimicrobial agents and the special equipment required for administration of each.
8. Describe contraindications and side effects of each drug that may be administered by aerosol as an antimicrobial agent.
9. Describe the purpose of lidocaine use during a bronchoscopy including strength and max dose.
10. Create a plan for using inhaled nitric oxide and inhaled epoprostenol as selective vasodilators, dosage, and method of administration and monitoring for adverse effects.
11. Discuss smoking cessation strategies and given a patient case be able to recommend appropriate pharmacologic smoking cessation therapy and instructions for use.
12. Identify the steps of rapid sequence intubation and summarize what actions and/or medications are administered at each step.
13. Explain the mechanism of action of neuromuscular blocking agents in patients requiring mechanical ventilation for respiratory failure.
14. List the medications used for pain management in the intensive care unit and identify possible adverse effects associated with these agents.
15. Assess the indications for deep sedation and light sedation and list appropriate medications for each indication.
16. Explain the rationale between coordinating daily sedation vacations with spontaneous breathing trials.
17. Distinguish between the various types of shock and identify the need for vasopressor therapy.
18. Explain the differences in action and adverse effects between the available vasoactive agents used for shock.
19. Indicate which advanced cardiovascular life support (ACLS) medications can be administered via an endotracheal tube and describe the proper administration technique.
20. Classify the stages of hypertension and discuss the physiologic factors that control blood pressure.

#### Module 4

##### Materials Covered:

Chapter 13

Chapter 14

Chapter 15

Chapter 16

##### Assessments:

Homework/Quizzes/Case Study/Tests

##### Learning Outcomes:

1. Design a plan for the treatment of hypertension by choosing the agents used as first line for the treatment of hypertension.
2. Discuss the mechanism of action of each class of diuretics and most common adverse effects and be able to determine the most appropriate class to use for the treatment of pulmonary edema.
3. Define heart failure with reduced ejection fraction (HFrEF), coronary artery disease, and arrhythmia and discuss drugs to treat.
4. Briefly review the process of coagulation and how it is affected by anticoagulants.
5. Identify the various injectable and oral anticoagulants and antiplatelet drugs and their respective mechanisms of action.
6. Compare the uses, mechanisms of action, and adverse effects of barbiturates and

benzodiazepines.

7. Describe drugs used to treat depression.
8. List the commonly used opioid and non-opioid analgesics and their place in the treatment of pain.
9. Describe the mechanism of action of opioid analgesics and the physiologic effects on each organ system.
10. Evaluate the differences in mechanisms of action and adverse effects between aspirin, acetaminophen, and nonsteroidal anti-inflammatory drugs.
11. Define the term general anesthesia and list the properties of an ideal general anesthetic.
12. Support the use of other drug classes in conjunction with inhaled anesthetics and list examples of these agents.
13. List the inhaled general anesthetic agents currently used and precautions.
14. Summarize the overall effects, therapeutic uses, and side effects of the glucocorticoids; also list some of the synthetic glucocorticoids.
15. Describe the overall function of the pancreas and explain the functions of insulin and glucagon.
16. List the pancreatic enzymes found in pancreatic enzyme replacement therapy for cystic fibrosis and explain the rationale for use.
17. Compare the pathogenesis of the two types of diabetes mellitus (DM).
18. Choose appropriate drug therapy for the treatment of type 1 and type 2 DM and describe the general mechanism of action and side effects of each drug class.
19. Describe the relationship between antigen–antibody reactions, mast cells, and histamine.
20. Identify the overall effects of histamine and list the locations and types of histamine receptors.
21. Distinguish between the common uses and the adverse effects of first- and second-generation antihistamines.
22. Define the terms antibacterial, antimicrobial, antiviral, antifungal, bacteriostatic, and bactericidal.
23. Describe and differentiate between penicillin's, cephalosporins, macrolides and tetracyclines.
24. Choose the most appropriate gram-positive drug and recommend the adverse effects to be monitored.
25. Identify the three categories of antifungal drugs, along with examples and adverse effects.
26. Describe the overall approach to the treatment of viral infections and list examples of antiviral drugs, along with therapeutic uses and adverse effects.
27. Recommend a four-drug treatment regimen for the management of tuberculosis and common side effects of each drug

## Part III: Grading and Assessment

### EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS\*:

Students' performance will be assessed and the weight associated with the various measures/artifacts are listed below.

#### EVALUATION\*

Homeworks/Quiz/Projects	15%
Tests	60%

Final Exam	25%
	100%

***\*Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.***

## **GRADING SYSTEM:**

A grade of "C" or better must be achieved in all required respiratory care program courses for a student to progress through the program. A final grade of less than 75% is not passing in the Respiratory Care Program and does not meet the requirements for progression within the program. This policy is different than the Horry Georgetown Technical College Grading Policy.

### **GRADING SCALE:**

100 - 90 =	A
89 - 80 =	B
79 - 75 =	C
74 - 69 =	D
68 - 0 =	F

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the [academic calendar](#) for deadlines for add/drop. You must attend at least one meeting of all your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

### **LATE ASSIGNMENTS:**

1. A maximum of one (1) scheduled exam may be made up at the discretion of the course instructor. Any subsequently missed exams will receive a grade of 0.
2. Makeup examinations will be taken in the testing center on campus or a location designated by the instructor.
3. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.
4. All missed exams will incur a 10% overall deduction unless medical documentation is provided.
5. Late Homework assignments will have a deduction of ten points of the total assignment grade. Late homework will not be accepted after 5 days.

## **Part IV: Attendance**

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be



present for a minimum of 80 percent (80%) of their classes in order to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 - Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student and a student may not be permitted to reenroll.

Respiratory Care follows the 90% attendance policy.

See Student Handbook for attendance policy.

## Part V: Student Resources



### THE STUDENT SUCCESS AND TUTORING CENTER (SSTC):

The SSTC offers to all students the following **free** resources:

1. **Academic tutors** for most subject areas, **Writing Center support**, and **college success skills**.
2. Online **tutoring** and academic support resources.
3. Professional and interpersonal communication **coaching** in the EPIC Labs.

Visit the [Student Success & Tutoring Center](#) website for more information. To schedule tutoring, contact the SSTC at [sstc@hgtc.edu](mailto:sstc@hgtc.edu) or self-schedule in the Penji iOS/Android app or at [www.penjiapp.com](http://www.penjiapp.com). Email [sstc@hgtc.edu](mailto:sstc@hgtc.edu) or call SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455, or go to the [Online Resource Center](#) to access on-demand resources.



### STUDENT INFORMATION CENTER: TECH Central

TECH Central offers to all students the following **free** resources:

1. **Getting around HGTC:** General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. Use the [Online Resource Center \(ORC\)](#) including Office 365 support, password resets, and username information.
3. **In-person workshops, online tutorials and more services** are available in Desire2Learn, Student Portal, Degree Works, and Office 365.
4. **Chat with our staff on TECH Talk**, our live chat service. TECH Talk can be accessed on the student portal and on TECH Central's website, or by texting questions to (843) 375-8552.

Visit the [Tech Central](#) website for more information. Live Chat and Center locations are posted on the website. Or please call (843) 349 – TECH (8324), Option #1.



## HGTC LIBRARY:

Each campus location has a library where HGTC students, faculty, and staff may check out materials with their HGTC ID. All three HGTC campus libraries are equipped with computers to support academic research and related school work; printing is available as well. Visit the [Library](#) website for more information or call (843) 349-5268.

## STUDENT TESTING:

Testing in an **online/hybrid** course and in **make-up exam** situations may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms (which may have a fee associated with the usage)

Furthermore, tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through our online proctoring service. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.

The **Instructor Information Sheet** will have more details on test requirements for your course.

## DISABILITY SERVICES:

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to HGTC's [Accessibility and Disability Service webpage](#). The Accessibility and Disability staff will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

## STATEMENT OF EQUAL OPPORTUNITY/NON-DISCRIMINATION STATEMENT:

Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

## TITLE IX REQUIREMENTS:

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college's Chief Student Services Officer, campus law enforcement, or with the college's Title IX Coordinator or designee.

\*Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

## INQUIRIES REGARDING THE NON-DISCRIMINATION/TITLE IX POLICIES:

**Student and prospective student** inquiries concerning Section 504, Title II, Title VII, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.

**Dr. Melissa Batten, VP Student Affairs**

*Title IX, Section 504, and Title II Coordinator*

Building 1100, Room 107A, Conway Campus

PO Box 261966, Conway, SC 29528-6066

843-349-5228

[Melissa.Batten@hgtc.edu](mailto:Melissa.Batten@hgtc.edu)

**Employee and applicant** inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources.

**Jacquelyne Snyder, VP Human Resources**

*Affirmative Action/Equal Opportunity Officer and Title IX Coordinator*

Building 200, Room 205B, Conway Campus

PO Box 261966, Conway, SC 29528-6066

843-349-5212

[Jacquelyne.Snyder@hgtc.edu](mailto:Jacquelyne.Snyder@hgtc.edu)