Carroll University– MSPAS Program
PHA 507: Pharmacotherapy and Pathophysiology I
Fall 2017

Course Number: Physician Assistant 507
Course Title: Pharmacotherapy and Pathophysiology I
Number of Credits: 4 Credit Hours
Day/Time: Tuesday / Noon-3:50 pm with additional sessions per Google Calendar
Prerequisites: Successful Completion of Year I Summer Courses
Faculty:
Eric Schmitt PharmD BCPS, BCCCP
Office Hours: by appointment
Telephone: 262-617-2718
E-mail: wm.pharmer@gmail.com
Paul Williams PharmD BCPS
Office Hours: by appointment
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E-mail: paul.williams@carrollu.com

Course Description
Therapeutic and drug product selection, including issues of efficacy, potential toxicities, side effects, compliance, monitoring parameters, drug interactions, and cost will be studied. Pathophysiology will be presented as it relates to disease states and the therapeutic mechanisms of treatment. The student will develop a rational approach to the selection of medications to be prescribed, and studies of medications used in the treatment of acute and chronic illnesses across the lifespan. Pharmacotherapy and Pathophysiology I runs concurrently with Clinical Medicine I and focuses on the therapeutics associated with disease states presented in Clinical Medicine. Some information will be presented in a case study format using patient scenarios to develop clinical pharmacology knowledge. Prerequisites: Successful completion of all courses in the summer term.

Course Content
This course is designed to provide the learner with a strong foundational knowledge in pharmacology. The student will actively engage in applying information within the classroom and study setting. Lecture, power point, and case learning activities will be employed throughout the course. The specific objectives for this course are to be used as a guide for reading, studying, and preparing for the course examinations, quizzes, and cases. Students are expected to be independent, self-directed learners.
**Student Expectations**

- demonstrates a positive attitude toward learning
- is on time for all scheduled classes, including timely return from breaks
- completes readings and assignments prior to class
- asks relevant and understandable questions
- takes full responsibility for learning and self-directed learning activities
- shows respect for self, other students, and faculty
- refrains from revealing negative feelings through tone of voice or body language
- refrains from disruptive activities during class including eating, talking, getting up and down, use of cell phone, etc.
- relies on personal resources before approaching others for help
- demonstrates cooperation with and mutual respect for peers
- responds to faculty, staff and peers readily and appropriately

**Instructor Expectations**

- demonstrates a positive attitude towards the facilitation of learning
- is on time for all scheduled classes
- should the need arise, reschedules class time with appropriate and timely notification to students, faculty, and staff
- provides appropriate course materials for class preparation prior to class
- is available for office hours or appointments to assist with questions; responds to faculty, staff, and students readily and appropriately
- listens attentively and initiates communication which is appropriate and timely
- identifies limitations in knowledge and provides appropriate resources for student learning
- provides timely and constructive feedback for assignments and assessments
- shows respect for self, students, and other faculty
- refrains from revealing negative feelings through tone of voice or body language
- demonstrates cooperation with and mutual respect for students, faculty, and staff

**Required Text and Reading**


**Grading**

The course grade for the fall semester will be based upon the following:

<table>
<thead>
<tr>
<th>Grades will be based on the following:</th>
<th>300</th>
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<tbody>
<tr>
<td>Exams (3 exams x 100 points each)</td>
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<td>Weekly quizzes and cases</td>
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<td>D</td>
<td>69.99 – 60%</td>
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**Attendance and Professionalism**

Attendance at all class periods, laboratories, and practical experiences are mandatory unless otherwise indicated. Poor attendance (unexcused absences, tardiness, and unauthorized early departures), lack of preparation, and unprofessional behavior may result in a lower or failing grade and/or be reported to the program progression committee. If you will be absent, tardy, or need to be excused early you must notify the course director via e-mail or phone prior to the scheduled meeting time. Tardiness and unauthorized early departures will be considered unexcused absences unless prior notification is submitted. Unexcused absences of more than 10% of class time may result in a failing grade. Absences are excused only at the discretion of the course director and/or the PA Program Director. Students may be required to make up missed laboratory time (excused or unexcused) at the discretion of the course director.

**Examinations**

There will be 3 exams during the semester. Please refer to the schedule for details. Exams are multiple choice exams and matching and are closed-book. Challenges to examination questions will be accepted for 1 week after the return of scores. Challenges must be submitted in writing via email with two written sources, at least one from recommended course readings.

No books, papers, notebooks, cellphones, smartphones, I-pods, I–pads, blackberry, etc. or backpacks/bookbags will be allowed on/near your desk during an examination. Recommend keeping personal belongings in the back of the room or in lockers. Hats are prohibited during an exam. Cellphones, smartphones, I-pods, I–pads, blackberry, etc must be turned off during an examination.

**Assignments**

Assignments and cases will be required and will be outlined on the LMS course site.

**Statement on Academic Integrity**

The Carroll University Academic Integrity Policy is located in the Carroll University Student Handbook. Students are encouraged to familiarize themselves with it. If a student violates this policy in any way, the instructor(s) reserve the right to impose a sanction of failure on the assignment/assessment or failure in the course. If you have questions about appropriate citations, please ask your instructor.
Accommodation for Disabilities

Any requests for accommodation for physical or cognitive disability must be made through the Walter Young Disability Services Coordinator at Carroll University. Appropriate accommodations will be evaluated based on the program technical standards once notification has been received from the Walter Young coordinator. If an individual student has special needs or concerns about course requirements related to religious beliefs, cultural issues, or other issues, the student must contact the Program Director with a request for accommodation.

Modifications to the Syllabus

The instructor and the University reserve the right to modify, amend, or change the syllabus (schedule, course requirements, grading policy, etc.) as the curriculum and/or program require(s).

Remediation

Students who receive a D or an F in this or any physician assistant year 1 course will be placed on academic probation.

During the course, a student who scores more than 2 SD below the mean on an exam/assessment may be required to complete additional work. The student will be contacted by the course instructor and asked to meet to discuss the remediation requirements for that particular assessment. Remediation requirements will be determined by the course instructor. When an instructor requires remediation of a student it does not affect the exam/assessment grade, nor does it improve the semester or course grade. Remediation is required to ensure that course objectives are met. It is expected that assigned work for the purpose of remediation be completed in a thorough, professional and timely manner. Satisfactory completion of remediated work will be determined by the course instructor. Students may be required to complete additional work if the original remediation is deemed unsatisfactory.

Students should make every effort to resolve remediation issues with the course director. If a student is unable to resolve such issues s/he may request a review by the Didactic Subcommittee. All decisions made by the subcommittee are final. If remediation is not successfully completed by the end of the course/semester a grade of “Incomplete” will be given until the work is successfully completed. Please note that an incomplete course grade may delay program progression and/or graduation. Information regarding incomplete grades is available in the Graduate Catalog.

Course Goals

The goal of pharmacology is to educate physician assistants to provide comprehensive quality health care to all, respectful of patient/client values, committed to ethical principles and grounded in evidence-based practice and clinical reasoning. Graduates will contribute to the profession and communities and be prepared to practice medicine in a variety of primary care settings under the supervision of physicians. Graduates will be prepared to provide services to medically underserved communities and diverse patient populations.
**Learning Outcomes**

At the end of the first semester of Pharmacotherapy (Pharmacotherapy and Pathophysiology I), the student will be able to compose a written medication prescription for a patient. In addition, the student should be able to design a treatment plan for diseases affecting the following organ systems: skin, lungs, gastrointestinal tract, heart, liver, pancreas, and urinary tract. Further, the student will use patient cases to evaluate current treatments and side effects and formulate an alternative treatment based on the currently guidelines and recommendations.

**Learning Objectives**

**A. Basic Pharmacology and Kinetics**

1. Formulate a plan for learning antibiotics
2. Define pharmacology, therapeutics, and pharmacotherapy
3. Interpret evidence-based medicine
4. Discuss pharmacokinetics and variables associated with kinetics
5. Calculate pharmacokinetic parameters associated with cases / examples
6. Highlight the plan for teaching pharmacotherapy
7. State expectations for students
8. Introduce antibiotics starting with penicillins

**B. Prescribing medication and medication risks during pregnancy**

1. Understand the basics of prescribing
2. List the basic parts of a prescription
3. Prepare and write a prescription
4. Translate and write prescription abbreviations
5. Describe medication pregnancy ratings

**C. Dermatology**

**Dermatologic drugs and drug reactions**

1. Describe the maculopapular skin reactions and know usual drug culprits
2. Describe drug hypersensitivity syndrome and know usual drug culprits
3. Describe Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN), know usual drug culprits, and treatments
4. Compose a treatment plan for common skin disorders
5. Propose causes of Diaper Dermatitis (diaper rash) and formulate a treatment plan
6. Understand the difference between complicated and uncomplicated vulvovaginal candidiasis treatment
7. Determine when it is appropriate to prescribe a tablet vs topical treatment (ie. Pregnancy)
8. Plan an appropriate treatment regimen for a tinea infection
9. Assess side effects associated with systemic treatments for skin disorders
Skin and Soft Tissue Infections

1. Differentiate the type of infections seen in skin and soft tissue
2. Devise treatments for these infections with a focus on the causative agents
3. Interpret secondary infections associated with skin and soft tissue and devise a treatment plan

D. Pulmonary

Chronic obstructive pulmonary disease
1. Describe chronic obstructive pulmonary disease (COPD) and design a treatment plan
2. Discuss and manage different phases of the disease
3. Assess baseline and exacerbation for COPD
4. Select treatments for the different phases: Bronchodilators, Steroids, and antibiotics

Bronchitis and Pneumonia
1. Select an appropriate treatment for acute bronchitis, chronic bronchitis, or pneumonia
2. Identify common organisms causing the specific lower respiratory tract infection
3. Categorize patients into either treatment or no treatment for chronic bronchitis
4. Schedule an antibiotic treatment regimen for a patient who has pneumonia (CAP, H-CAP, etc.)
5. Identify the offending bacteria responsible for the upper respiratory tract infection
6. Prescribe an alternative therapy based on a failure to a first line agent
7. Identify a length of therapy based on the type of upper respiratory tract infection

Asthma
1. Define the inflammatory process as it relates to the disease process and treatment of asthma
2. Explain the pharmacology behind using β2-agonists in the treatment of asthma
3. Understand the variability in treating asthma and the individualization needed to customize therapy
4. Apply and define asthma severity based on symptoms, nighttime awakenings, etc
5. Describe exercise-induced bronchospasm
6. Explain the differences between MDI and DPI’S
7. Explain the use of spacers with inhalers
8. Demonstrate proper inhaler technique
9. Provide a treatment plan for asthma patients

Pulmonary Artery Hypertension
1. Define the goals of treatment for pulmonary artery hypertension (PAH)
2. Name conventional therapy agents and mechanism for helping with PAH
3. Describe how prostacyclin analogs work and be able to name common side effects
4. Describe how endothelin receptor antagonists work and be able to name common side effects
5. Explain how phosphodiesterase inhibitors work and common side effects
6. Formulate treatment options for WHO functional class I, II, III, and IV PAH
**Influenza Virus**
1. Determine which patients can receive live vs inactivated influenza vaccine (Age, Pregnant, Immunocompromised, etc)
2. Prescribe an antiviral treatment for a patient who tests positive for the influenza virus
3. Compare and contrast the differences in prescribing prophylactic vs treatment antivirals for influenza

**D. Gastrointestinal**

**Nausea and Vomiting**
1. Discuss causes for nausea and vomiting
2. Prescribe treatments with a focus on simple nausea and vomiting
3. Differentiate a treatment plan focusing on limitation for various disease states
4. Describe causes for diarrhea
5. Compose treatment options based off of etiology if known
6. Formulate ways to prevent loose stool

**Inflammatory bowel disease**
1. Describe the various forms of inflammatory bowel disease
2. Select various treatment options based on severity of disease
3. Discuss the limitations and adverse effects of treatment

**E. Cardiology**

**Hypertension**
1. Identify goal blood pressure for selected patients based off other disease states
2. Categorize patients into prehypertension, stage I, or stage II
3. Recommend a specific drug therapy for a patient with hypertension
4. Identify when patients need a combination of two antihypertensive agents
5. Define hypertension urgency and emergency
6. Define resistant hypertension
7. Modify a drug regimen when initial therapy is not at the blood pressure goal
8. Identify and explain the mechanism of action (MOA) for selected antihypertensives
9. Describe common side effects for antihypertensives

**Dyslipidemia**
1. Explain the link of elevated LDL and low HDL with coronary heart disease
2. Describe common side effects associated with pharmacologic therapies with hyperlipidemia
3. Rationalize add on therapy when patients that are not at goal therapy
4. Demonstrate and name the major risk factors that modify LDL goals
5. Compose a treatment plan based off (a cholesterol panel) total cholesterol, LDL-C, HDL-C, and triglycerides
6. Name the LDL cholesterol goals and cutpoints for therapy
7. Name the lipid effects of different pharmacologic agents
Acute Coronary Syndromes

1. Describe the pathophysiology, signs and symptoms of ACS
2. Describe the treatment options based off that pathophysiology
3. Identify the three treatment phases and the treatment goals
4. Prepare a treatment alternative if contraindications are present
5. Compose a treatment plan based off a case scenario

Arrhythmias

1. Describe two approaches on how to understand antiarrhythmics
2. Differentiate between the drugs that can treat narrow complex tachycardia and the limitations
3. Identity contraindications for the specific medications and how that applies to treatment
4. Illustrate complications to the disease state and the treatments
5. Compare treatments for wide complex tachycardia

Heart Failure (Systolic and Diastolic)

1. Describe the difference between diastolic and systolic heart failure
2. Explain what and how pharmacological agents alter the renin-angiotensin-aldosterone system (RAAS)
3. Describe the evidence and mechanism behind angiotension-converting enzyme inhibitors
4. Explain the role of beta-blockers and diuretics in diastolic and systolic heart failure
5. Identify which beta-blockers have evidence supporting there use in heart failure
6. Explain the evidence behind the use of digoxin in heart failure
7. Describe monitoring and precautions in dosing aldosterone antagonists
8. Explain the use of the combination of hydralazine and nitrates in heart failure
9. Understand common causes of diastolic and systolic heart failure
10. Describe current treatments for diastolic heart failure and how they differ from systolic heart failure
11. Name the common side effects associated with the treatments for heart failure

E. Heme/Onc

Anemias and Coagulation Disorders

1. Manage the treatment of anemia with a focus on the pharmacology
2. Discuss vital vitamins needed for good blood production
3. Discuss iron supplements pros and cons
4. Interpret a small glimpse at hemolysis and blood loss
5. Present coagulation cascade and discuss medications that affect the cascade
6. Discuss hemophilia type A and B and their treatments
7. Recognize von Willebrand disease and point out the differences from hemophilia
8. Compare different acquired coagulation disorders
Cancer Treatment and Chemotherapy

1. Differentiate typical cancer etiologies
2. Describe five stages of a cell's growth cycle
3. Identify which/where chemotherapy agents will work during the cell growth cycle
4. Name agents that are cycle or non-cycle dependent

Lymphoma, Acute Leukemia, and Chronic Leukemia

1. Explain the differences between acute leukemias
2. Define treatment of acute leukemias
3. Identify common side effects with treatment
4. Describe the corticosteroid controversy with treatment of ALL
5. Explain central nervous system prophylaxis and why it is important
6. Define treatment of chronic leukemias
7. Name common side effects of treatments used in chronic leukemias
8. Describe the mechanism of action and drug interactions with associated treatments
9. Describe the disease presentation
10. Identify and characterize the various lymphoma classifications
11. Explain the various treatments
12. Expound upon the failures and allude to the direction treatment is headed

F. GI

Gastroesophageal Reflux Disease

1. Identify a treatment for mild, moderate and severe gastroesophageal reflux disease
2. Name common side effects and monitoring for selected treatments
3. Discuss which agents are available over the counter and by prescription

Peptic Ulcer Disease

1. Recognize risk factors associated with peptic ulcer disease
2. Prescribe a first line treatments for H.pylori eradication
3. Recognize H.pylori resistance and modify treatment therapy
4. Identify IV formulations of proton pump inhibitors
5. Employ a prescribe a regimen for reducing gastrointestinal risk in patients receiving NSAID therapy

Portal Hypertension, Cirrhosis, and Drug-Induced Liver Disease

1. Compose a basic treatment for management of portal hypertension and variceal bleeding
2. Explain the role of B-blockers in the treatment of portal hypertension
3. Describe the role diuretics play in the management of patients with cirrhosis
4. Create a treatment plan with octreotide for variceal bleeding
5. Prepare treatments for spontaneous bacterial peritonitis
Pancreatitis

1. Propose a basic treatment for patients with acute pancreatitis
2. Formulate and prescribe an effective opiate for pain relief in acute pancreatitis
3. Identify whether a patient needs enteral or parenteral feeding while treating pancreatitis
4. Describe the role that pancreatic enzymes play in the treatment of chronic pancreatitis

Viral Hepatitis

1. Identify which vaccines are available to prevent viral hepatitis
2. Understand the treatment options for HAV, HBV, and HCV
3. Recognize and monitor for side effects of treatment
4. Explain the role of resistance in management of HBV and HCV

F. Urinary

Prostate Cancer and Benign Prostatic Hyperplasia

1. Discuss physiological causes of BPH
2. Detect pharmacological causes for BPH
3. Discuss signs and symptoms of disease
4. Select an appropriate treatment for a patient with BPH
5. Detect pharmacologic treatments that can modify PSA testing
6. Distinguish between symptoms of progression of disease vs side effects of medication
7. Formulate an appropriate treatment timeline for a patient
8. Discuss risk factors and how that relates to treatment
9. Present chemopreventive medications and discuss the benefits and the draw-backs
10. Classify staging and how that relates to treatment
11. Propose treatment options
12. Recognize adverse effects associated

Urinary Tract Infections and Prostatitis

1. Name common causes of urinary tract infections
2. Prescribe a treatment for a patient with a urinary tract infection
3. Differentiate between a complicated and uncomplicated urinary tract infection
4. Describe common resistance patterns for urinary tract infections

Sexually Transmitted Disease

1. Prescribe an appropriate treatment for patient’s infected with a specific sexually transmitted disease
2. Identify growing resistance within treatments of STD’s
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<tr>
<th>DATE</th>
<th>TOPIC(S)</th>
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<tr>
<td>Friday 9/8</td>
<td>Pharmacology, kinetics</td>
<td>Schmitt</td>
<td>eChapters 4 and 5</td>
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<td>Tuesday 9/12</td>
<td>Dermatologic drug reactions and common skin conditions, acne vulgaris,</td>
<td>Williams</td>
<td>Chapter e99, 96-97, and Chapter 122</td>
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<td>psoriasis, and superficial fungal infections</td>
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<td>Tuesday 9/19</td>
<td>Acute coronary syndromes and arrhythmias, lower and upper respiratory</td>
<td>Schmitt</td>
<td>Chapter 17 (Look at Chapter e11), Chapter e18,</td>
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<td>Chapter 107-108</td>
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<td>Hypertension and dyslipidemia</td>
<td>Williams</td>
<td>Chapter 13 and Chapter 21</td>
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<td>Tuesday 10/3</td>
<td><strong>Exam 1 from noon-2pm</strong> Chronic obstructive pulmonary disease</td>
<td>Schmitt</td>
<td>Chapter 27</td>
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<td>Tuesday 10/10</td>
<td>Heart failure (Systolic and Diastolic)</td>
<td>Williams</td>
<td>Chapter 14-15</td>
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<td>Tuesday 10/24</td>
<td>Asthma, pulmonary artery hypertension, drug induced pulmonary diseases,</td>
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<td>Tuesday 10/31</td>
<td>Anemias, coagulation disorders, and cancer treatment and chemotherapy</td>
<td>Schmitt</td>
<td>Chapter 100-101, and Chapter 127</td>
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<td>Urinary tract infection, sexually transmitted disease, and skin and soft</td>
<td>Williams</td>
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<td>Chapter 132, and Chapter 134-135</td>
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<td>Evaluation of the gastrointestinal tract, gastroesophageal reflux disease,</td>
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<td>Tuesday 11/28</td>
<td>Prostate cancer and benign prostatic hyperplasia</td>
<td>Schmitt</td>
<td>Chapter 131 and 84</td>
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<td>Tuesday 12/5</td>
<td>Portal hypertension, cirrhosis, drug-induced liver disease, pancreatitis,</td>
<td>Williams</td>
<td>Chapter 37, 39, 40 and eChapter 38</td>
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<td>Tuesday 12/12</td>
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<td>Friday 12/15</td>
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