

PHA5755

Microbiology, Immunology, and Virology

Fall Term, 2020
2 Credit Hours – [A-E Grading]

The purpose of this course is to establish the student pharmacist's foundation in the principles of medical microbiology, immunology and virology that will build upon the knowledge and skills gained in the Pathophysiology and Patient Assessment course sequence. In order to successfully manage a patient with an infectious disease, the student pharmacist must first understand the role of the host's immunologic response and the burden of disease caused by clinically important pathogens. The content in this course will lay the foundation for the subsequent patient care series where the pharmacology and medicinal chemistry of anti-infective agents and pharmacotherapy of infectious diseases will be learned and applied to optimize the care of a patient.

Teaching Partnership Leaders

Anthony M. Casapao, PharmD, MPH

- Email: Casapao@cop.ufl.edu
- Office: Jacksonville Campus
- Phone: 904-244-9129

Office Hours: Please see Canvas course site for posted office hours.

See Appendix A. for Course Directory of Faculty and Staff Contact Information.

Entrustable Professional Activities

This course will prepare you to perform the following activities which the public entrusts a Pharmacist to perform:

2. Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.

ST2.3. Interpret laboratory test results

3. Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that is evidence-based and cost-effective

ST3.2. Develop a treatment plan with a patient. (including recommend therapeutic alternatives and generic substitution)

11. Educate patients and professional colleagues regarding the appropriate use of medications.

ST11.1. Lead a discussion regarding a recently published research manuscript and its application to patient care.

Course-Level Objectives

Upon completion of this course, the student will be able to:

1. Identify how the body's immune system interacts with invading microbes, including bacteria and viruses, and the physiological and pathological consequences.
2. Associate the role of the normal human microbiota with the prevention of disease.
3. Describe the pathogenesis of bacterial and viral infections.
4. Apply knowledge of clinical laboratory techniques in the diagnosis of infectious diseases.
5. Interpret microbiological, immunological, and virological laboratory data in the context of a patient's clinical presentation and findings.
6. Correlate the major types of pathogenic microorganisms and the diseases they produce in humans.
7. Recognize infectious diseases for which an antimicrobial agent or vaccine would be indicated and select an appropriate agent based on spectrum of activity.
8. List the major classes of antimicrobial agents and their general spectrum of activity.
9. Identify mechanisms of microbial resistance and their potential impact on treatment.
10. Collaborate effectively with other team members to evaluate patient cases that require application of the principles of medical microbiology, immunology, and virology.
11. Solve case-based problems that require application of the following principles:
 - a. Interaction between the immune system and invading microbes.
 - b. Clinical bacteriology and laboratory diagnostics.
 - c. Pathogenesis, diseases, and antimicrobial agents of choice for gram positive microorganisms.
 - d. Pathogenesis, diseases, and antimicrobial agents of choice for gram negative microorganisms.
 - e. Clinical virology (laboratory diagnostics and common viral pathogens)).

Course Pre-requisites

1. Completion of all Year 1 PharmD program coursework including milestones.

Course Co-requisites

1. PHA5163L Professional Practice Skills Laboratory III

Course Outline

See Appendix. Please routinely check your campus calendar and the Canvas course site for any messages about changes in the schedule including meeting dates/times, deadlines, and room changes.

Required Textbooks/Readings

1. Karen C. Carroll, Stephen A. Morse, Timothy Mietzner, Steve Miller. Jawetz, Melnick, & Adelberg's Medical Microbiology, McGraw-Hill, 28th edition, 2019, ISBN 978-1-260-01202-6.

- Available via HSC Library – Access Pharmacy:

Use [UF VPN to access UF Libraries Resources](#) when off-campus. The UF HSC library staff can assist you with questions or issues related to accessing online library materials. For assistance contact your College of Pharmacy librarian or visit the [HSC Library Website](#) at this URL: <http://www.library.health.ufl.edu/>

Use [UF VPN to access UF Libraries Resources](#) when off-campus.

The UF HSC library staff can assist you with questions or issues related to accessing online library materials. For assistance contact your College of Pharmacy librarian or visit the [HSC Library Website](#) at this URL:<http://www.library.health.ufl.edu/>

Suggested Textbooks/Readings

Suggested readings will be posted on Canvas.

Other Required Learning Resources

Poll Everywhere. Refer to Canvas for instructions

Materials & Supplies Fees

None

Student Evaluation & Grading

Evaluation Methods and How Grades are calculated.

[The Canvas© gradebook will be set-up using the percentages below to compute the grade.]

Assessment Item	Grade Percentage
Individual Readiness Assessments [3 @ 6.66% ea.]	20%
Readiness Assessments [3 @ 8.33% ea.]	25%
Self-Assessment from Modules in Canvas	10%
Final Exam	45%
Total	100%

Table 1.1 Evaluation and Grading Above

Table 1.2 grading scale

Percentage	Letter Grade
92.50-100%	A
89.50-92.49%	A-
86.50-89.49%	B+
82.50-86.49%	B
79.50-82.49%	B-
76.50-79.49%	C+
72.50-76.49%	C

69.50-72.49%	C-
66.50-69.49%	D+
62.50-66.49%	D
59.50-62.49%	D-
< 59.50%	E

Rounding of grades:

Final grades in Canvas will be rounded to the 2nd decimal place. If the decimal is X.495 or higher, Canvas will round the grade to X.50. The above scale depicts this policy and grades are determined accordingly. Grade assignment is made using this policy and NO EXCEPTIONS will be made in situations where a student's grade is "close."

Makeup Assignments

Makeup assignments may be required for excused absences from all Active Learning Sessions. Students will be required to complete the makeup assignment within one week of the missed session.

Educational Technology Use

The following technology below will be used during the course and the student must have the appropriate technology and software.

1. ExamSoft™ Testing Platform
2. Canvas™ Learning Management System

For technical support, navigate to [Educational Technology and IT Support Contact Information](#) at this URL:

<http://curriculum.pharmacy.ufl.edu/current-students/technical-help/>

Pharm.D. Course Policies

The Policies in the following link apply to this course. Review the General [Pharm.D. Course Policies](#) carefully, at this URL:

<http://curriculum.pharmacy.ufl.edu/current-students/course-policies/>

Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Appendix A. Course Directory

Teaching Partnership Leader/Course Director(s):

Anthony M. Casapao, PharmD, MPH

- Email: Casapao@cop.ufl.edu
- Office: Jacksonville Campus
- Phone: 904-244-9129

Questions to Ask:

- Concerns about performance
- Guidance when there are performance problems (failing grades)
- General questions about content

Other Teaching Partnership Faculty Members:

Lindsey Childs-Kean, PharmD, MPH, BCPS

Email: lchilds-kean@cop.ufl.edu

Office: HPNP 2314A

Phone: 352-273-5715

Veena Venugopalan, PharmD, BCPS

Email: vvenugopalan@cop.ufl.edu

Office: HPNP 2314A

Phone: 352-265-0111 (Ext. 45892)

Bin Liu, PhD

Email: liu@cop.ufl.edu

Office: MSB P2-31

Phone: 352-273-7747

Juergen Bulitta, PhD

Email: jbulitta@cop.ufl.edu

Office: Orlando Campus

Phone: 407-313-7010

Ashley N. Brown, PhD

Email: Ashley.brown@medicine.ufl.edu

Office: College of Medicine

Phone: 407-313-7063

Eric F. Egelund, PharmD, PhD

Email: EEgelund@cop.ufl.edu

Office: Jacksonville Campus

Phone: 904-244-9876

Barbara Santevecchi

Email: BSantevecchi@cop.ufl.edu

Office: GNV

Phone: 352-273-5393

Instructional Designer:

Elliot Tordoff, MSc, PGCE

- Email: etordoff@cop.ufl.edu
- Office: HPNP 4309
- Phone: 352-294-5215

Academic Coordinator Gainesville Campus:

Name: Misti Merrill

- Office: HPNP 4312
- Phone: 352-273-5617

Absence/Tardy Email: absent2pd@cop.ufl.edu (Visit the [course policy site](#) for instructions)

Educational Coordinators

Name: McKenzie Wallen

- Email: mwallen@cop.ufl.edu
- Office: Jacksonville Campus

Name: Iverta Allen

- Email: iallen1@cop.ufl.edu
- Office: Orlando Campus

Questions to Ask:

- Issues related to course policies (absences, make up exams, missed attendance)
- Absence/tardy requests (Only the Academic Coordinator handles absence requests)
- Questions about dates, deadlines, meeting place
- Availability of handouts and other course materials
- Assignment directions
- Questions about grade entries in gradebook (missing grades, incorrect grade)
- Assistance with ExamSoft® (Distance campus students may contact the Educational

- Coordinator for use of Exemplify and assistance during exams. The Academic Coordinator is the contact person for issues related to grading and posting of ExamSoft grades.

Appendix B: Course Outline:

[Recommended dates for independent study]	Delivery Date	Delivery Time	Mod#	Unit Topic	Contact Time [hr.]a	Responsible	Syllabus Learning Objectives
			0	Watch: Introduction		Casapao	
			1	Module 1: Interaction Between Immune System and Invading Microbes		Bin Liu	1-5
8/5/20			1.1	Watch: Immune Defense – Part A	1	Bin Liu	
8/5/20			1.2	Watch: Immune Defense – Part B	1.25	Bin Liu	
8/5/20			1.3	Watch: Immune Defense – Part C	0.75	Bin Liu	
8/5/20			1.4	Watch: Immune Defense – Part D	0.5	Bin Liu	
8/6/20			1	Hand Washing Past and Present -- A Lesson in Learning (PDF)		Bin Liu	
8/6/20			1	Module 1 Knowledge Check		Casapao	
			2	Module 2: Clinical Bacteriology and Laboratory Diagnostics		Venugopalan	2-5
8/6/20			2.1	Watch: Introduction to Microbiology (Part 1 and Part 2)	0.75	Venugopalan	
8/6/20			2.2	Watch: Diagnosing Bacterial Infections – Blood Cultures	0.5	Venugopalan	
8/6/20			2.3	Watch: Diagnosing Bacterial Infections – Urine Cultures	0.5	Venugopalan	
8/7/20			2.4	Watch: Diagnosing Bacterial Infections – Respiratory	0.25	Venugopalan	
8/7/20			2.5	Watch: Diagnosing Bacterial Infections – Wound	0.25	Venugopalan	
8/7/20			2.6	Watch: Interpreting Bacterial Susceptibilities	0.75	Venugopalan	
8/7/20			2.7	Watch: Rapid Diagnostics: Immunoassays	0.25	Venugopalan	
8/7/20			2.8	Watch: Rapid Diagnostics: Nucleic Acid Testing	0.25	Venugopalan	
8/7/20			2.9	Watch: Candida diagnostics	0.25	Venugopalan	
8/10/20			2	Watch: BD BACTEC™: Blood culture collection best practices https://www.bd.com/en-us/company/video-gallery?video=4713958311001	0.125	Venugopalan	
8/10/20			2	Watch: Bronchoalveolar Lavage (BAL) in the ICU https://www.youtube.com/watch?v=OwXQA3ab7Yg	0.125	Venugopalan	
			3	Module 3: Gram Positives		Casapao	3-10
8/10/20			3	Read: Medical Microbiology Chapter 11: subsections on B. cereus, C. botulinum, C. tetani, and C. difficile	0.5		
8/11/20			3	Read: Medical Microbiology Chapter 12: subsection on "Lipophilic Corynebacteria"	0.25	Venugopalan	
8/11/20			3	Read: Medical Microbiology Chapter 21: subsections on "physiology and growth conditions for anaerobes", "the polymicrobial nature of anaerobic infections", and "diagnosis of anaerobic infections"	0.25	Venugopalan	

8/11/20			3.1	Watch: Staphylococci	0.75	Venugopalan	
8/11/20			3.2.1	Watch: Streptococci Overview	0.75	Casapao	
8/11/20			3.2.2	Watch: Streptococcus pyogenes		Casapao	
8/11/20			3.2.3	Watch: Streptococcus pneumoniae		Casapao	
8/11/20			3.2.4	Watch: Other Streptococci species		Casapao	
8/11/20			3.3	Watch: Enterococcus		Casapao	
8/11/20			3.4	Watch: Bacillus species	0.25	Casapao	
8/11/20			3.5	Watch: Listeria & Corynebacterium	0.25	Casapao	
8/11/20			3.6	Watch: Clostridium Species	0.75	Venugopalan	
8/11/20			3	Chapter 13: The Staphylococci		Venugopalan	
8/11/20			3	Read: The Streptococci, Enterococci, and Related Genera (Chapter 14) in: Karen C. Carroll, Stephen A. Morse, Timothy Mietzner, Steve Miller. Jawetz, Melnick, & Adelberg's Medical Microbiology, McGraw-Hill, 28th edition, 2019.		Casapao	
8/11/20			3	Module 3 Self-Assessment Questions_ https://ufl.instructure.com/courses/354643/files/38611513/download?wrap=1		Casapao	
8/11/20				Module 3 Study Guide		Casapao	
8/11/20	08/12/20	1.55 - 3:50 pm	1-3	Active Learning Session 1: Gram Positives (2 hours)	1.95	Casapao, Venugopalan	3-10
			1-3	iRAT/tRAT 1		Casapao	3-10
			1-3	Active Learning Session 1: Gram Positives (1 hours)	1	Venugopalan	3-10
			1-3	Active Learning Session 1: Gram Positives (1 hours)	1	Casapao	3-10
			4	Module 4: Gram Negatives and Candida		Casapao	3-10
			4	Read: Medical Microbiology Chapter 21: subsections on "physiology and growth conditions for anaerobes", "the polymicrobial nature of anaerobic infections", and "diagnosis of anaerobic infections"		Casapao	
8/13/20			4.1.1	Watch: Enterobacteriaceae Overview	0.25	Casapao	
8/13/20			4.1.2	Watch: Escherichia	0.25	Casapao	
8/13/20			4.1.3	Watch: Klebsiella	0.25	Casapao	
8/13/20			4.1.4	Watch: Enterobacter, Citrobacter, and Serratia	0.25	Casapao	
8/13/20			4.1.5	Watch: Other Important Enterobacteriaceae	0.25	Casapao	
8/13/20			4.2.1	Watch: Non-fermenters: Pseudomonas aeruginosa	0.75	Bulitta	
8/13/20			4.2.2	Watch: Non-fermenters: Acinetobacter baumannii	0.2	Bulitta	
			4.3	Watch: Non-fermenters: Stenotrophomonas maltophilia; Burkholderia cepacia	0.5	Casapao	
8/14/20			4.4	Watch: Gram-Negative Anaerobes	0.25	Casapao	
8/14/20			4.5.1	Watch: Pleomorphic bacteria - Haemophilus influenzae	0.25	Santevecchi	
8/14/20			4.5.2	Watch: Pleomorphic bacteria - Bordetella pertussis	0.25	Santevecchi	
8/14/20			4.6	Watch: Helicobacter pylori	0.25	Santevecchi	
8/14/20			4.7	Watch: Neisseria	0.25	Santevecchi	
8/14/20			4.8	Watch: Chlamydia	0.25	Santevecchi	
8/14/20			4.9.1	Watch: Mycoplasma	0.25	Santevecchi	

8/14/20			4.9.2	Watch: Legionella	0.125	Santevecchi		
			4.10.0	Watch: Mycobacterium	0.25	Egelund		
8/14/20			4.11	Watch: Candida spp	0.25	Santevecchi		
8/14/20			4	Self-Assessment Questions (Word)		Casapao		
8/14/20			4	Karen C. Carroll, Stephen A. Morse, Timothy Mietzner, Steve Miller, Jawetz, Melnick, & Adelberg's Medical Microbiology, McGraw-Hill, 28th edition, 2019, ISBN 978-1-260-01202-6. (AccessPharmacy) Chapter 15: Enteric gram-negative rods (Enterobacteriaceae) Chapter 16: Pseudomonads and Acinetobacter Chapter 17: Helicobacter pylori Chapter 18: Haemophilus, Bordetella (Haemophilus influenzae and B. pertussis) Chapter 20: Neisseriae (N. gonorrhoeae and N. meningitidis) Chapter 23: Mycobacteria Chapter 25: Mycoplasma (Mycoplasma pneumoniae section only) Chapter 27: Chlamydia spp (Chlamydia trachomatis and Chlamydia pneumoniae only). http://accesspharmacy.mhmedical.com/			Casapao	
8/14/20			4	CDC Drug Resistance Threats (PDF) http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf#page=53		Casapao		
8/14/20			4	CDC Antibiotic Resistance Patient Safety Atlas - Summary of Results https://gis.cdc.gov/grasp/PSA/Downloads/ARPatientSafetyAtlas-SummaryofResults.pdf		Casapao		
8/14/20			4	CDC Antibiotic Resistance Patient Safety Atlas https://gis.cdc.gov/grasp/PSA/MapView-Look at Florida for CRE and other Gram negatives Click on "Go To Interactive App" Click Florida and organism of interest from drop down menu on left hand side of page		Casapao		
8/14/20	08/17/20	1.55 - 3:50 pm	4	Active Learning Session 2: Gram Negatives (2 hours)	1.95	Casapao, Santevecchi	3-10	
			4	iRAT/tRAT 2		Casapao, Santevecchi		
			5	Module 5: Clinical Virology, Laboratory Diagnostics, and Common Viral Pathogens		Childs-Kean	3-10	
			5	Read: Medical Microbiology, Chapter 38 (see Canvas for sections)	1.75	Childs-Kean		
8/18/20			5	Read: Medical Microbiology, Chapter 37 (see Canvas for sections)	0.25	Childs-Kean		
8/18/20			5	Read: Medical Microbiology, Chapter 36 (see Canvas for sections)	0.5	Childs-Kean		
8/18/20								

			5	Read: Medical Microbiology, Chapter 40 (see Canvas for sections)	1	Childs-Kean	
8/18/20			5	Read: West Nile virus Clinical Evaluation & Disease	0.17	Childs-Kean	
8/19/20			5	Read: West Nile virus Prevention	0.05	Childs-Kean	
8/19/20			5.1	Watch: Virology Basics	0.75	Brown	
8/19/20			5.2	Watch: Influenza	0.5	Brown	
8/19/20			5.3	Watch: HIV	0.5	Childs-Kean	
8/19/20			5.4	Watch: Hepatitis A, B, and C	0.5	Childs-Kean	
8/20/20			5.5	Watch: Varicella/Zoster, HSV, CMV, Epstein-Barr	0.75	Childs-Kean	
8/20/20			5.6	Watch: Coronaviruses	0.33	Brown	
8/20/20			5	Karen C. Carroll, Stephen A. Morse, Timothy Mietzner, Steve Miller. Jawetz, Melnick, & Adelberg's Medical Microbiology, McGraw-Hill, 27th edition, 2015, ISBN 978-0-07-182498-9. Chapter 29: General Properties of Viruses Chapter 30: Pathogenesis and Control of Viral Diseases		Childs-Kean	
8/20/20	08/21/20	1:55 - 3:50 pm	5	Active Learning Session 3: Virology (2 hours)	1.95	Brown, Lindsey Marie Childs-Kean	3-10
			5	iRAT/tRAT 3		Childs-Kean	
			5	ACCESS CODE PROTECTED: PMMIV Module 5 TBL Student Guide.pdf		Childs-Kean	
TBC			1-5	Zoom: Exam Review (1 hour)		Casapao, Brown, JBulitta, Childs-Kean, Venugopalan, Santevecchi	1-10
	08/26/20	8:30 - 10:30 am	1-5	Final Exam: Modules 1-5 (2 hours)	2	Casapao	1-10
Total Contact Hours in Course:					33.2		