MARSHALL UNIVERSITY
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School of Pharmacy

Syllabus
PHAR 542: Immunology and Microbiology (fall, 2015)

This syllabus is not to be construed as a contract with the student and is subject to change.

The School of Pharmacy reserves the right to change the course syllabus. *The School should notify the students through the course notification system or by an email preferably through the Blackboard system.*

Some course materials used in this class may be copyrighted and should not be shared with individuals not enrolled in this course.

Course meeting days and time	Tuesday & Thursday, 10:15 – 11:45 AM
Location	Studio Classroom L04
Team Leader / Instructor	Timothy Long, Ph.D.
Office	CEB 220
Phone	304-696-7393
Email	longt@marshall.edu
Office hours	Tuesday 5:30 – 6:30 PM and by appointment

Faculty	Email	Office	Phone	Office Hours
Jeremy McAleer, Ph.D.	mcaleer@marshall.edu	CEB 235	304-696-7336	Tuesday 4:00 – 5:00 PM and by appointment

Each faculty member will be available to meet with students outside of office hours by appointment. If the instructor accepts appointments, then please email the instructor for availability. The student can expect the instructor to respond to E-mails and phone messages within 72 hours.

Course Description: Topics covered include an introduction to the classification, morphology and physiology of microorganisms, primarily organisms that can cause human pathology, such as bacteria, viruses, fungi, protozoans, parasites, and worms; the body's immune response and mechanisms of defense at the cellular and humoral (molecular) level will also be covered in the context of pathogenic organisms, tissue transplants, and autoimmune disease.

Course Objectives:

Number	Objective	Linkage to MUSOP Abilities	How Assessed
1	Understand general principles of microbial taxonomy and physiology	10	Exams, IRAT/GRAT, Active Learning Exercise
2	Be able to define principles of infectious diseases	10	Exams, IRAT/GRAT, Active Learning Exercise
3	Be able to define the general principles of host-parasite relationships	10	Exams, IRAT/GRAT, Active Learning Exercise
4	Be able to define the pathogenic organisms of man	10	Exams, IRAT/GRAT, Active Learning Exercise

5	Be able to describe the inflammatory responses to infectious agents	10	Exams, IRAT/GRAT, Active Learning Exercise
6	Understand human immunity and immune responses	10	Exams, IRAT/GRAT, Active Learning Exercise
7	Understand principles of antigen-antibody relationships	10	Exams, IRAT/GRAT, Active Learning Exercise
8	Understand antibody synthesis, development, function, and immunopathology	10	Exams, IRAT/GRAT, Active Learning Exercise

Schedule of Activities:

Week	Discussion No.	Date	Weekday	Time	Meeting Topic	Course Student Learning Outcomes 1-75	Instructor
1	D1	08/25/15	Tues.	10:15-11:45	Introduction to the Immune System	**1** Define immunological organs **2** Delineate the functions of specific cell types **3** Explain the roles of "innate" and "adaptive" immune responses	McAleer
	D2	08/27/15	Thurs.	10:15-11:45	Lymphocyte Development / Antigens	**4** Identify how lymphocytes acquire antigen recognition capability **5** Specify how tolerance to self-antigens is maintained **6** Define structural features of B cell receptors and T cell receptors	McAleer
2	D3	09/01/15	Tues.	10:15-11:45	Innate Immunity	**7** Summarize innate barriers to infectious agents **8** Explain how leukocytes are recruited to sites of infection **9** Describe pattern recognition receptors **10** Describe the mechanism of NK cell-mediated cytotoxicity	McAleer
	D4	09/03/15	Thurs.	10:15-11:45	Adaptive Immunity	**11** Understand the role of innate immunity in T cell stimulation **12** Discuss the signals required for lymphocyte activation and differentiation **13** Report the benefits of secondary immune responses **14** Define immunological memory including major cell types	McAleer
3	D5	09/08/15	Tues.	10:15-11:45	Primary Immunodeficiencies	**15** Analyze the impact of inherited immunodeficiencies on host defense **16** Describe common inheritance patterns of primary immunodeficiencies **17** Identify laboratory tests used for diagnosis **18** Evaluate strategies used to treat diseases	McAleer
	D6	09/10/15	Thurs.	10:15-11:45	Mucosal Immunity	**19** Define mucosal barriers to infection and lymphoid structures **20** Describe roles for commensal bacteria in host defense and disease **21** Outline the immune response to an intestinal helminth infection **22** Describe mechanisms that can induce oral tolerance to antigens	McAleer
4	D7	09/15/15	Tues.	10:15-11:45	Vaccines	**23** Describe vaccine formulations and their mechanism of action **24** Describe adjuvants and their role in vaccine design **25** Discuss the role of memory cells in immunity **26** Examine potential advantages/pitfalls of vaccines versus antibiotics	McAleer
	D8	09/17/15	Thurs.	10:15-11:45	Autoimmunity	**27** Examine mechanisms of how autoimmunity is initiated **28** Discuss mechanisms that contribute to tissue destruction **29** Discuss techniques used to diagnose autoimmunity **30** Identify treatments for autoimmunity	McAleer

5		09/22/15	Tues.	10:15-11:45	Optional EXAM 1 review	Review D1-D6	McAleer
		09/22/15	Tues.	6:30-8:30	**EXAM 1, D1-D6**		McAleer
	D9	09/24/15	Thurs.	10:15-11:45	Hypersensitivity and Allergies	**31** Distinguish the mechanisms causing type I and type IV hypersensitivity reactions **32** Identify treatments for hypersensitivities	McAleer
6	D10	09/29/15	Tues.	10:15-11:45	Tumor immunity	**33** Understand how the immune system responds to tumors **34** Identify ways to manipulate immunity in order to treat established tumors	McAleer
	D11	10/01/15	Thurs.	10:15-11:45	Transplantation immunology	**35** Identify immunological principles of tissue transplantation **36** Describe treatments used to prolong graft survival	McAleer
7	D12	10/06/15	Tues.	10:15-11:45	HIV infection	**37** Define the pathogenesis of HIV infection **38** Outline laboratory techniques used to diagnose HIV infection **39** Explain drug targets for HIV infection	McAleer
		10/08/15	Thurs.	10:15-11:45	Optional EXAM 2 review	Review D7-D12	McAleer
8		10/12/15	Mon.	6:30-8:30	**EXAM 2, D7-D12**		McAleer
	D13	10/13/15	Tues.	10:15-11:45	Clinical Bacteriology I	**40** Delineate the morphological, structural and metabolic differences of eubacteria **41** Group bacteria into classification schemes according to morphology, cell structure and growth requirements **42** Differentiate prokaryotes from eukaryotes according to cell structure and metabolism	Long
	D14	10/15/15	Thurs.	10:15-11:45	Clinical Bacteriology II	**43** Delineate commensal bacteria according to colonization site **44** Identify pathogenic bacteria based on organ systems **45** Describe the clinical methods to identify etiological agents based on infection site	Long
9	D15	10/20/15	Tues.	10:15-11:45	Infections of the Skin, Bone, and Joints	**46** List the major etiological agents of bacterial skin, bone, and joints infections **47** Describe the epidemiology, transmission and pathophysiology of bacterial skin, bone, and joints infections **48** Give examples of prototypical agents used in the pharmacotherapy of bacterial skin, bone, and joints infections	Long
	D16	10/22/15	Thurs.	10:15-11:45	Infections of the Gastrointestinal and Genitourinary Tract	**49** List the major etiological agents of gastrointestinal and genitourinary tract infections **50** Describe the epidemiology, transmission and pathophysiology of gastrointestinal and genitourinary tract infections **51** Give examples of prototypical agents used in the pharmacotherapy of gastrointestinal and genitourinary tract infections	Long
10	D17	10/27/15	Tues.	10:15-11:45	CNS and Upper Respiratory Tract Infections	**52** List the major etiological agents of CNS and upper respiratory tract infections **53** Describe the epidemiology, transmission and pathophysiology of CNS and upper respiratory tract infections **54** Give examples of prototypical agents used in the pharmacotherapy of CNS and upper respiratory tract infections	Long
	D18	10/29/15	Thurs.	10:15-11:45	Lower Respiratory Tract Infections, and Tuberculosis	**55** List the major etiological agents of lower respiratory tract infections and tuberculosis **56** Describe the epidemiology, transmission and pathophysiology of lower respiratory tract infections, tuberculosis and bacteremia **57** Give examples of prototypical agents used in the pharmacotherapy of lower respiratory tract infections and tuberculosis	Long

11	D19	11/03/15	Tues.	10:15-11:45	Endocarditis, Bacteremia, and Sepsis	**58** List the etiological agents of implicated in endocarditis, bactermia, and sepsis **59** Describe the epidemiology, transmission and pathophysiology of endocarditis, bactermia, and sepsis **60** Give examples of prototypical agents used in the pharmacotherapy of endocarditis, bactermia, and sepsis	Long
		11/05/15	Thurs.	10:15-11:45	Optional EXAM 3 Review	Review D13-D19	Long
12		11/09/15	Mon.	6:30-8:30	**EXAM 3, D13-D19**		Long
	D20	11/10/15	Tues.	10:15-11:45	Clinical Virology and Herpesvirus Infections	**61** List the families and species of DNA/RNA viruses implicated in human diseases. **62** Summarize the viral replication cycle **63** Describe the epidemiology, transmission, and pathologies of HHV including herpes simplex virus (HSV), varicella zoster virus (VZV), Epstein-Barr virus (EBV), cytomegalovirus (CMV), and Kaposi's sarcoma-associated herpes virus (KSHV/HHV-8)	Long
	D21	11/12/15	Thurs.	10:15-11:45	Viral Infections of the Respiratory Tract and Liver	**64** Describe the epidemiology, transmission and pathologies of the major human respiratory viruses including rhinovirus, adenovirus, parainfluenza, human influenzavirus and respiratory syncytial virus (RSV). **65** Describe the epidemiology, transmission and pathologies of the viruses that cause hepatitis **66** Describe the epidemiology, transmission and pathologies of the viruses that are associated with pediatric diseases	Long
13	D22	11/17/15	Tues.	10:15-11:45	Mycology: Fungal Biology & Human Diseases	**67** Differentiate fungi and eubacteria in terms of cellular structure, physiology, and life cycle. **68** Describe the etiologies, transmission, and pathologies of superficial, cutaneous, and subcutaneous mycoses in humans **69** Give examples of prototypical agents used in the pharmacotherapy of mycoses	Long
	D23	11/19/15	Thurs.	10:15-11:45	Opportunistic Infections in Immunocompromised Patients	**70** List the major causes of opportunistic infections in immunocompromised patients **71** Describe the epidemiology, transmission and pathophysiology of opportunistic infections in immunocompromised patients **72** Give examples of prototypical agents used in the pharmacotherapy of opportunistic infections	Long
		11/24/15	no meeting		Fall break		
		11/26/15	no meeting		Fall break		
14	D24	12/01/15	Tues.	10:15-11:45	Parasitology: Protozoan Biology & Diseases	**73** Identify the major parasitic pathogens implicated in human disease. **74** Describe the epidemiology, transmission, and pathologies of helminthic diseases **75** Describe the epidemiology, transmission, and pathologies of amebiasis, giardiasis, and malaria	Long
		12/03/15	Thurs.	10:15-11:45	Optional EXAM 4 review	Review D19-D24	Long
15		12/10/15	Thurs.	2:00 PM	**FINAL EXAM**		Long, McAleer

Course Delivery. Course delivery methods will include Active Learning Events (ALEs) with group discussion. Students are also required to be prepared with the appropriate technology needed for the course and each session. You will need a Turning Technologies Response RF device for in-class polling incorporated into PowerPoint presentations. For IRATs/GRAT and exams, you will be required to bring your personal laptop and have the Respondus Lockdown Browser as described below under Test Security section of the syllabus.

Attendance Policy. Each student is required to attend class. Attendance is mandatory at graded events. Only excused absences accepted – refer to university and school policies. Make up grades will be given only in cases of extraordinary circumstances due to documented illness (i.e., doctor's note) or death of a family member.

Course Material Policy. All handouts, PowerPoint presentations, and class materials posted on Blackboard are intended for the sole use of students registered in PHAR 542. Sharing any of these materials with individuals outside the class including students in future classes will be considered a violation of professionalism standards. Accepting answers to course

assignments including case discussions, team-based learning sessions, and homework from upper class students or classmates will be considered a violation of academic integrity.

University Policies. University policies regarding Academic Dishonesty, Students with Disabilities, University Computing Services' Acceptable Use, Affirmative Action, and Sexual Harassment can be found at http://www.marshall.edu/wpmu/academic-affairs/policies/ .

Course Grades. Final course grades will be calculated as follow:

Point Distribution:	IRATs/GRATs/ALEs: 15% Hourly Exams: 60% (3 x 20%) Final Comprehensive Exam: 25%
Letter grades distribution:	A = 89.50 to100% = A B = 79.50 to less than 89.50% C = 69.50 to less than 79.50% F = Less than 69.50%

School of Pharmacy Policies.

SOCIAL JUSTICE POLICY STATEMENT. Marshall University is committed to bringing about mutual understanding and respect among all individuals and groups at the University. As part of Marshall University, School of Pharmacy has made a commitment to social justice. Therefore, no one will be discriminated against on the basis of race, gender, ethnicity, age, sexual orientation, religion, social class, or differing viewpoints. Each student will be viewed as a valuable member of this class and as the faculty for the course, I will strive to facilitate an atmosphere/learning environment where mutual understanding and respect are actualized.

ACADEMIC, ETHICAL, AND PROFESSIONAL CONDUCT. Student expectorations for academic, ethical, and professional conduct are defined within the school's Ethical and Professional Conduct Policy and the university's Academic Dishonesty Policy.

Second Chance and Remediation Policy. Second chance and remediation are mechanisms designed to assist students who have struggled within the classroom environment in demonstrating achievement of classroom and curricular learning outcomes. These processes are described in sections 200.001.003 (Second Chance) and 200.001.004 (Remediation) of the Academic Standards for Grading, Progressions, Dismissal, and Re-admission Policy.

Test Security Policy. In order to ensure the security of all examinations, the School of Pharmacy has adopted the following policies:

1. Test Administration
   - A. Non-electronic testing
     - a. Students may not access any electronic equipment during the exam that has not been provided by the faculty, including but not limited to calculators, cell phones, laptops and PDAs.
   - B. Electronic testing
     - a. Only those resources (electronic or otherwise) approved by the instructor may be used or accessed during the testing session.
     - b. Students enrolled within courses using electronic testing must download and install the Respondus Lockdown Browser. The installation will require an installation code that must be acquired from Computing Services.

2. Test Review
   - A. Students will not be allowed to view any exam without direct supervision of course faculty or site facilitator
   - B. Students must review tests within time specified by the course faculty.
   - C. Limited numbers of students may be allowed to view the exam at one time depending on office size, space, and faculty preference.
   - D. Students will be allowed to review the exam only one time, and time limits may be placed on review as specified by course faculty.
   - E. NO notes can be taken by the student while reviewing the test, and students are not allowed to access any electronics while reviewing the tests. NO copies electronic or written!
   - F. Individual student printouts for exams are to be retained by the faculty.
   - G. Faculty have the right to place further restrictions on test review as deemed necessary.