

# Medical Microbiology & Immunology Syllabus for Med 3 semester

## Medical University of the Americas Summer Semester 2010

### Contact Information:

#### Offices of faculty:

1. Dr. Chitnis, Course Director- Basement of new building- room 7103
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**Office Hours:** Dr. Cadinouche: M-F: 1-2 PM & Feel free to drop by the office anytime  
Weekly Immunology Reviews: Day/Time TBA  
Dr. Chitnis: M-F: 12: 30 - 2 PM

\*Faculty are available after class (when they are scheduled to lecture) and at other times by appointment.

### Class Time:

**Lecture:** 2 PM - 4:50 M-F except 2 – 3:50 PM on lab days M -F

**Laboratory:** Either 4 – 5:20 PM or 5:30 - 7:00 PM on assigned lab days (either Wednesday or Thursday) during **Weeks 3, 6, 7,9, 10, 15 (written exam)**. If necessary, this schedule may be amended with one-week notice.

Total hours:

- 1.Lectures: 200 hours
  2. Lab/student: 12 hours
  3. Credit hours : 13 hours
- Total hours : 225 hours

**NOTE:** Each student will be assigned to attend one lab session each of the weeks listed above. Some weeks you will be expected to come to lab the day following your scheduled lab to check culture **results or at other designated times**. The lab will be open during lunch on the days following lab. You must bring the lab handout with you to each lab. **Sharing a handout is NOT allowed while performing graded elements for the lab.**

### Textbooks & Other Materials:

**1. REQUIRED TEXT:** Murray, P.R., K.S. Rosenthal, and M.A. Pfaller. 2005. *Medical Microbiology*, 6<sup>th</sup> edit. Elsevier-Mosby (ISBN 0-323-03303-2).

**2. REQUIRED TEXT:** Abbas, A.K. and A.H. Lichtman. 2009. *Basic Immunology: Functions and Disorders of the Immune system*, 3<sup>rd</sup> ed. Elsevier-Saunders ISBN 978-1-4160-4688-2

#### **3. Required Readings for the Immunology Section:**

Abbas and Lichtman, 2009. Chapters 1 to 12 i.e., Pages:1 to 291 inclusive.  
Murray Book: Pages: 87 to 154 inclusive.

**4. OTHER REQUIRED MATERIALS: Small notebook or folder with paper that you must bring to ALL labs.** You will use it to record announcements, changes in lab directions, etc. Also, you **MUST keep all graded work** in it until the end of the semester.

#### 4. OPTIONAL BOOKS:

Nath, S.K. and S.G. Revankar. 2006. Problem-based Microbiology. Elsevier-Saunders ISBN-13 978-0-7216-0630-9

Gorczynski, R.M and J. Stanley. 2006. Problem-based immunology. Elsevier-Saunders ISBN-13 978-1-4160-2416-3

5. **OPTIONAL REVIEW BOOKS:** All of these contain the same basic information as each other. You should select one, if you wish, whose style and learning hints are helpful to you. Review of Medical Microbiology and Immunology, Warren Levinson, McGrawhill, Lange is an excellent review book. Many students have found *Clinical Microbiology Made Ridiculously Simple* to be an excellent resource. Also First Aid latest edition seems to work well with many students before the shelf exams.

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### Course Description:

#### **MED 311 - Microbiology and Immunology**

This lecture and laboratory course provides the fundamental principles of microbiology including the sub-disciplines of immunology, virology, bacteriology, mycology, and parasitology. The structure of microorganisms including the pathogenetic properties of fungi, bacteria, and viruses are examined in detail. Further topics include the workings of the human immune system including the intricate processes of antigen recognition, immunoglobulin production and the detection of antigen-antibody reactions. Basic genetic and molecular biological concepts are integrated and connected to clinical manifestations of disease and immunopathological reactions (such as hypersensitivity, autoimmunity, transplantation concerns, tumor immunology, hematology, reproduction, infectious disease, and immunodeficiency). Students acquire an understanding of the physiological and virulence properties of microorganisms and epidemiological factors contributing to human infectious disease; immunological responses contributing to health and disease; and an introduction to the activities and uses of antimicrobial agents for asepsis and treatment.

#### **(12 Credits; 225 hrs. Lecture/Lab)**

*Prerequisites: Completion of Anatomy is required. Completion of Physiology is recommended.*

The immunology portion of the course will provide information on the molecules, cells, tissues, and organs of innate and acquired immunity with details on ontogeny, activation, and interactions. The microbiology portion will provide basic information about the agents of infectious disease as well as the epidemiology, transmission, clinical presentations, diagnosis, and treatment of the diseases they cause. At the end of the course, you will have a basic understanding of how the immune system works to protect the body from disease, how infectious agents cause disease, and the interaction of the two that either leads to a state of health or disease.

There is a vast amount of information to learn in 15 weeks. Much of the information that you learn in immunology and microbiology is necessary, if you are to be successful in later courses (especially pharmacology, pathology, clinical medicine) and clinical rotations. Also, if you are a primary care physician, much of your practice will involve the evaluation and treatment of patients with infectious diseases. It will benefit you immensely to learn as much as possible while you are in this course; however, do learn what you learn very well.

## Laboratory:

The laboratory experience has four major objectives: (1) awareness and practice of aseptic technique; (2) ability to follow directions; (3) mastery of some basic laboratory skills: preparing smears and Gram-staining bacteria, T-streaking agar plates for isolation of bacteria; and (3) understanding of the role diagnostic tests play in the practice of medicine. During your training it is conceivable that you may be asked to perform the techniques you have learned

At each lab session each student will be expected to master certain skills and to meet stated objectives. In addition, you are expected to use aseptic technique at all times and to take care of your microscope, label every culture fully, keep the lab clean, and dispose of used materials properly. All tasks for a given lab will be checked off for each student. Successful performance of these tasks will count toward your overall lab grade **according to the rubrics and points assigned. The performance of these laboratory tasks will be done by the individual student without help from other students or the instructor. Reference to the individual student's lab handout or personal notes is allowed.** There is no mechanism for make-up of labs so please plan to attend 100% of your assigned sessions.

## Attendance Policy:

Participation in instructional activities reveals a student's attitude toward his/her professional preparation. Students are expected to attend and participate in all aspects of the course. If you are not present at the time attendance is taken, you will be marked absent. You must be in the classroom at the beginning of class for the quizzes or anytime roll is taken to be counted present for the day. If you fail to return to class after a break or other designated activity, then you will be counted absent for that day. **Attendance for lectures is 80%. Lab attendance is mandatory.** Students who fail to meet the course attendance requirements will be administratively withdrawn from class per the MUA Attendance Policy.

**Excused absences:** Excused absences may be arranged in advance with the Associate Dean or are granted by the Associate Dean for medical or personal emergencies. Upon presentation of a note from a licensed physician or of proper documentation of a personal or family emergency, the Associate Dean grants an excused absence. The written approval of the absence from the Associate Dean must be presented to the course director.

## Classroom Etiquette:

1. Arrive at class 5-10 minutes early. Settle yourself and turn off your cell phone. Also, return at the stated time after breaks. Class will begin promptly at 2 pm and after breaks.
2. Please be PRESENT – be attentive and contribute to the class discussion when appropriate. Avoid watching videos, playing computer games, etc.
3. Stay for the entire class - avoid packing up before the class ends.
4. You may bring sugar-free beverages into the classroom but do not bring and eat food.

## Grades:

Grades are recorded to one decimal place. The semester grade percentage will be determined by rounding up numbers  $\geq 0.5$  to the next whole number (e.g., 78.6% = 79% or 78.4% = 78%).

### **Grades will be determined based on the following distribution:**

- 12 %-Block 1 exam
- 19%-Block 2 exam
- 19%-Block 3 exam
- 19%-Block 4 exam
- 20 % -NBME Shelf Exam
- 4 % - Lecture Quizzes (4 Highest out of 6 quizzes)
- 7 % -Total Lab (lab practicals and written lab exam)

## **GRADED WORK**

### **Lecture Quizzes :**

There will be a mandatory 6 quizzes on Monday or Tuesday (10-25 questions) during the semester and 4 highest will be used for grades. The lecture quizzes will cover important information that you must learn (usually memorize). Each quiz will cover material from the previous week's lectures ( more info on this in class).

### **Block exams:**

These will consist of extended matching and multiple choice questions, many of which will ask for the item that is "most likely." A total of 45-70 questions will be given with 1 min 30 sec /question timing. There will be a mixture of first-order and higher-order questions like asked in USMLE and shelf exams with an emphasis on application of basic microbiology and immunology knowledge.

If you miss a block exam because of a medical or personal emergency, you will be allowed to make up the missed exam with written approval of the excused absence by the Associate Dean. The format of the make-up exam is at the discretion of the professor and may be oral, written answer, or the usual multiple-choice format. Any scaling performed on the original exam is not guaranteed on the make-up exam.

**Make-up exam policy:** Absences from a scheduled exam may be arranged in advance with the Associate Dean. Alternatively, missed exams caused by absences for medical or personal emergencies that are approved in writing by the Associate Dean may be made up with full credit for the exam. If a student misses an exam without an excused absence, he/she may take a make-up exam but the maximum score that the student will receive on the exam is 60%. The format of make-up exams is at the discretion of the professor and may be multiple-choice, essay, short-answer, oral, etc. Make-up exams may not be eligible for extra-credit points and/or scaling.

Note: (Microbiology and Immunology Section) Quizzes and Block examination(s) are based on ALL materials covered and discussed in class and any material assigned from the required textbook ( this will be discussed in class).

### **Examination Hygiene:**

1. Neither faculty proctors nor testing proctors present during an examination may be asked to interpret questions or give definitions. If there is an error identified on a question, a correction will be announced and written on the board at the front of the room. It is your responsibility to make the appropriate correction on the examination.
2. Nothing is to be on the desk except for a No. 2 lead pencil with eraser.
3. Remove hats and sunglasses. Place them under your desk or in your backpack.
4. All backpacks, computer cases, briefcases, and purses must be in an area designated by the faculty.
5. No food or beverages (including water bottles).
6. No cell phones, calculators, or other electronic items.
7. Leave the Scantron in the exam booklet and give it to a proctor.
8. Both 30 minute and 10 minute warnings will be given at the appropriate times.
9. Please dress appropriately for possible variations in room temperature.

**Use of computers: Students can use laptops during the lecture hours to make notes.**

**MUA policy on academic honesty: Please refer to MUA student hand book.**

## Microbiology- Immunology Lecture Schedule

Week	Topics	Teachers
1 May 3-8	General Microbiology	Dr Chitnis
2 May 10-14	Bacteriology	Dr Chitnis
Block1	May 17, Monday	
3 May 18-21	Bacteriology	Dr Chitnis
4 May 24-28	Bacteriology	Dr Chitnis
5 May 31-June 4	Mycology	Dr Chitnis
Block2	June 7, Monday	
6 June 8-11	Immunology	Dr Cadinouche
7 June 14-18	Immunology	Dr Cadinouche
8 June 21-25	Immunology	Dr Cadinouche
Block3	June 28, Monday	
9 June 29-July 2	Immunology	Dr Cadinouche
10 July 5-9	Virology	Dr Chitnis
11 July 12-17	Virology	Dr Chitnis
Block4	July 19, Monday	
12 July 20-23	Immunology/Virology Review	Dr Cadinouche
13 July 26-30	Parasitology	Dr Chhatre
14 Aug 2-6 shelf exam	Shelf reviews Micro, Immuno	Dr Chitnis, Dr Cadinouche
15 Aug 9-12 Final lab exam, Quiz		Dr Chitnis

**For detailed syllabus see the table below**

## Microbiology- Immunology Lecture Schedule

Week	Topics	Suggested reading
6,7,8,9,12	Immunology	Abbas, A.K. and A.H. Lichtman. 2009. Basic Immunology
	Syllabus and Schedule; Introduction to immunology & Cells of the Immune System	Chapter 1: Pages 1 to 22
	Cells, tissues, and organs of the immune system	Chapter 1: Pages 1 to 22
	Antigens/Antigen Recognition Molecules-Antibodies	Pages: 24 Chapter 7: Pages 131 to 151 Chapter 8: 153- 171
	Antibody structural and functional diversity; Innate immunity- Introduction	Chapter 4: Pages: 67-87 Chapter 2: Pages 23 to 43
	Innate immunity	Chapter 2: Pages 23 to 43

	Mechanisms of evasion of innate immunity Introduction to Adaptive Immunity	See Chapter 1- Intro Adaptive Immunity
	Antigen Recognition Molecules - T Cell Receptor TCR	Pages: 8,9, 67-70, 74- 76, 94
	Major Histocompatibility Complex MHC	Pages: 8,9, 19, 46, 51-65
	Antigen Capture, Processing, and Presentation	Chapter3: Pages 45-65
	T-cell development; T cell activation	Chapter5: Pages 89-111 Chapter6: Pages 113- 129
	Immunology B-cell development; B-cell activation	Chapter7: Pages 131- 151
	Immunodeficiencies -	Chapter 12: Pages 223 to 237
	Immunodeficiencies cont'd Hypersensitivity type 1, Hypersensitivity types 2-4	Chapter12: Pages 223 to 237 Chapter 11: Pages 205 to 221
	Hypersensitivity types 2-4 cont'd	Chapter 11: Pages 205 to 221
	Tolerance; autoimmunity	Chapter 9:Pages 173 to 187
	Transplantation and rejection; immunosuppressive drugs	Chapter 10: Pages 189 to 204
	Transplantation and rejection; immunosuppressive drugs cont'd Vaccination	Chapter 10: Pages 189 to 204 Chapter8: Pages 169- 171
	Antigen Capture, Processing, and Presentation- cont'd	Chapter3: Pages 45-65
	T-cell development; T cell activation	Chapter5: Pages 89-111 Chapter6: Pages 113- 129
	B-cell development; B-cell activation	Chapter7: Pages 131- 151
	Immunodeficiencies -	Chapter 12: Pages 223 to 237
	Immunodeficiencies cont'd Hypersensitivity type 1, Hypersensitivity types 2-4	Chapter12: Pages 223 to 237 Chapter 11: Pages 205 to 221
	Hypersensitivity types 2-4 cont'd	Chapter 11: Pages 205 to 221
	Tolerance; Autoimmunity	Chapter 9:Pages 173 to 187
	Tumor Immunology: Transplantation and rejection; immunosuppressive drugs	Chapter 10: Pages 189 to 204
	Tumor Immunology; Transplantation and rejection; immunosuppressive drugs cont'd Vaccination, Clinical cases	Chapter 10: Pages 189 to 204 Chapter8: Pages 169- 171
<b>Week 1,2,3,4,5,10,11,13</b>	Comparison of infectious agents; Introduction to microbiology and bacterial classification; Prokaryotic cell structure	Medical Microbiology Murray 6 <sup>th</sup> edition chapter 1-8, pages 3-79
<b>General</b>	Bacterial growth and metabolism; Normal flora;	

<b>Microbiology</b>	Laboratory diagnosis	
	Bacterial genetics; Sterilization and disinfection	
	Antimicrobials	
<b>Bacteriology</b>	Bacterial pathogenesis; gram-positive bacilli: <i>Bacillus</i> and <i>Clostridium</i>	Medical Microbiology Murray 6 <sup>th</sup> edition Chapter 18-47 pages-179-451
	Gram-positive bacilli: <i>Corynebacterium</i> , <i>Listeria</i> , and <i>Erysipelothrix</i> ; <i>Nocardia</i> and related bacteria	
	Gram-positive, acid-fast bacilli: <i>Mycobacterium</i>	
	Staphylococcus, Streptococcus ,	
	Enterococcus, Neisseria	
	Intro to gram negative rods, Enterobacteriaceae	
	Vibrio, Campylobacter, Helicobacter	
	Pseudomonas and related Hemophilus and related bacteria	
	Bordetella, Brucella, spirochetes, Francisella, Coxiella, Rickettsia, Mycoplasma, Chlamydia	
<b>Virology</b>	Introduction to viruses, Lab diagnosis virology	Medical Microbiology Murray 6 <sup>th</sup> edition Chapter 48-67, pages-467-667
	Herpes, Pox viruses, Parvo viruses,	
	Papova and Adenoviruses	
	Paramyxo, orthomyxo,	
	Herpes, Pox viruses, Parvo viruses,	
	Papova and Adenoviruses	
	Paramyxo, orthomyxo,	
	Bunya, Arena, Rhabdo, Filo and Borna viruses	
	Flavi, toga, reo viruses	
	Picorna, Corona,	
	Hepatitis viruses, Tumor viruses,	
	slow viruses ,HIV , retroviruses	
	AIDS, viral pathogenesis	
<b>Mycology</b>	<i>Introduction to Mycology, LD</i>	Medical Microbiology Murray 6 <sup>th</sup> edition Chapter 69-74 pages- 689-751
	Superficial mycoses, cutaneous mycoses	
	Subcutaneous mycoses,	
	Systemic infections, Opportunistic fungi	
<b>Parasitology</b>	Intro to parasitology, LD, Intestinal protozoans	Medical Microbiology Murray 6 <sup>th</sup> edition Chapter 81-85 pages- 821-881
	Blood and Tissue protozoa , Cestodes	
	Trematodes, Nematodes	

