The Florida State University
College of Medicine

# General Medical Microbiology and Infectious Disease

SCHEDULE

BMS 6301

FALL 2011

# General Medical Microbiology and Infectious Disease

## FALL 2011 SCHEDULE

Check locations for course activities in your FSUCOM master OUTLOOK class calendar. Materials for these events can be found at the course's Blackboard Web Site (http://campus.fsu.edu). Note that due to room scheduling conflicts and other exigencies, the schedule is subject to change and the student is advised to check the electronic OUTLOOK version of the schedule frequently. Changes in the schedule will also be e-mailed to the class. The lectures are designed to cover the course content in an organized fashion, illustrating the concepts and allowing time for you to ask questions.

| Date | Session | TOPIC |
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| 8/15<br>10-11am | Introduction | **Introduction to the Course:** learning objectives; course format; evaluation, testing, and grading policies; expectations; BlackBoard structure. |
| 8/16 &<br>8/19 | Online Module 1 | **Bacterial Classification, Morphology & Cell Structure:** must be completed BEFORE the "Microscopy Skills Laboratory". Medically important groups of microorganisms; classification (taxonomy) of bacteria; morphology (cell shapes, gram stain); ultrastructural features (cytoplasm, cell envelope, external features); bacterial spores. |
| **8/23** | | **Quiz 1** |
| 8/24<br>8-9am | Lecture 1 | **Bacterial Culture and Physiology:** nutrient requirements of bacteria, overview of metabolism, aerobic respiration, anaerobic respiration, fermentation, biosynthesis, bacterial growth. |
| 8/24<br>9-10am | Lecture 2 | **Bacterial Genetics:** the bacterial genome (chromosome, extrachromosomal elements, bacteriophages), gene organization (operons, cistrons), DNA replication (binary fission, replication rules & fidelity), mutation & repair (types of mutations, mutagens, DNA repair processes), gene transfer (transposons, extrachromosomal elements), mechanisms of DNA exchange, recombination, genetic engineering, polymerase chain reaction. |
| 8/26<br>8-10am | Small Group 1 | **Bacterial Genetics & Antibiotic Resistance -** cases illustrating the role of gene transfer in rapid spread of antibiotic resistance & development of multiple resistance, causes of antibiotic resistance, implications for future practice of medicine. |
| **8/30** | | **Quiz 2** |
| 8/30<br>10-11am | Lecture 3 | **Sterilization, Disinfection & Antisepsis:** medical importance of methods, definitions and approaches (sterilization, disinfection, antisepsis), mechanisms of action (physical and chemical agents). |
| 8/30<br>11-12pm | Lecture 4 | **The Gram-Positive Cocci – I:** *Staphylococcus aureus* (cutaneous infections, food poisoning, endocarditis, toxic shock syndrome, etc.), *Staphylococcus epidermidis* (endocarditis, catheter & shunt infections, etc.), *Staphylococcus saprophyticus* (urinary tract infection) |
| 9/1<br>10-11am | Lecture 5 | **The Gram-Positive Cocci – II:** *Streptococcus pyogenes* (pharyngitis, impetigo, erysipelas, rheumatic fever, etc.), *Streptococcus pneumoniae* (pneumococcal pneumonia, otitis media, sinusitis, meningitis, etc.), *Streptococcus agalactiae* (neonatal diseases, other infections), *Enterococcus* (urinary infections, septicemia, endocarditis). |
| 9/1<br>11-12pm | Lecture 6 | **Bacterial Respiratory Infections (Opportunistic and Respiratory Pathogens):** *Pseudomonas aeruginosa* (pulmonary, skin & urinary infections, etc.), *Bordetella pertussis* (whooping cough), *Haemophilus influenzae* (meningitis, otitis, arthritis, etc.), *Legionella pneumophila* (Legionnaires' Disease, Pontiac fever), *Neisseria meningitidis* (meningitis, etc.) |

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| 9/2<br>8-10am | Small Group 2 | **Molecular & Serologic Diagnostic Methods -** cases illustrating the technology of DNA probes, DNA fingerprinting methods, PCR-based methods, precipitation & immunodiffusion, enzyme-linked immunofluorescence assays (ELISA), radioimmunoassay (RIA), etc. |
| **9/9** | | **Exam I** |
| 9/12<br>9-10am | Lecture 7 | **Anaerobic Metabolism; Gram-Negative Anaerobes & Gram-Positive Anaerobic Bacilli:** *Clostridium perfringens* (gas gangrene, food poisoning, etc.), *Clostridium tetani* (tetanus), *Clostridium botulinum* (botulism), *Clostridium difficile* (gastroenteritis), *Propionibacterium* (acne); *Bacteroides*, *Prevotella*, and *Fusobacterium* species. |
| 9/12<br>10-11am | Lecture 8 | **Gram-Negative Enteric Bacilli (Facultative Anaerobes):** *Escherichia coli* (gastroenteritis), *Klebsiella pneumonia* (pneumonia), other members of the family *Enterobacteriacae* |
| 9/14<br>8-9am | Lecture 9 | **Gram-Negative Enteric & Zoonotics:** *Salmonella* (gastroenteritis, enteric fevers, etc.), *Shigella* (shigellosis), *Yersinia* (bubonic plague, enterocolitis), *Vibrio* (cholera, gastroenteritis, etc.), *Campylobacter* (gastroenteritis), *Helicobacter* (gastritis, gastric & duodenal ulcers), *Francisella tularensis* (tularemia), *Brucella* (undulant fever, etc.) |
| 9/14<br>9-10am | Lecture 10 | **Gram-Positive Zoonotic Pathogens and Other Gram Positives:** *Bacillus anthracis* (anthrax), *Listeria monocytogenes* (neonatal diseases, etc.), *Erysipelothrix rhusiopathiae* (erysipeloid), and *Corynebacterium diphtheriae* (diphtheria). |
| 9/16<br>8-10am | Small Group 3 | **Aseptic Practice & Nosocomial Infections -** cases illustrating the etiology & epidemiology of nosocomial infections, medical & economic significance, techniques for prevention of nosocomial infections. |
| **9/20** | | **Quiz 3** |
| 9/21<br>8-10am | Small Group 4 | **Laboratory Diagnosis of Bacterial Diseases – Culture & Handling:** cases illustrating collection & handling of specimens, types of pathogens to be expected for various body fluids & tissues, etc. |
| 9/23<br>8-9am | Lecture 11 | **Gram-Positive Zoonotic Pathogens and Other Gram Positives:** *Bacillus anthracis* (anthrax), *Listeria monocytogenes* (neonatal diseases, etc.), *Erysipelothrix rhusiopathiae* (erysipeloid), and *Corynebacterium diphtheriae* (diphtheria). |
| 9/23<br>9-10am | Lecture 12 | **Spirochetes and Sexually-Transmitted Infections.** *Neisseria gonorrhoeae* (gonorrhea, PID, etc.), *Treponema pallidum (*syphilis), *Borrelia* species (Lyme disease and Relapsing fever), *Chlamydia trachomatis* (Chlamydia and PID), *Haemophilus ducreyi* (chancroid) |
| 9/26<br>9-11am | Small Group 5 | **Sexually Transmitted Infections -** cases from the CDC illustrating the pathogenesis of bacterial and parasitic sexually transmitted infections |
| **9/27** | | **Quiz 4** |
| 9/29<br>8-9am | Lecture 13 | **Rickettsial, & Chlamydial Pathogens:** *Rickettsia rickettsiae* (Rocky Mountain spotted fever), *Rickettsia prowazekii* (epidemic typhus), *Rickettsia typhi* (endemic typhus), *Coxiella burnetii* (Q fever), *Chlamydia trachomatis* (conjunctivitis & trachoma), *Chlamydophila pneumoniae* (pneumonia), *Chlamydophila psittaci* (ornithosis). |
| 9/29<br>9-10am | Lecture 14 | ***Actinomyces, Nocardia*, Mycobacteria & Mycoplasmas:** *Actinomyces* (endogenous infections), *Nocardia* (pulmonary & cutaneous infections), *Mycobacterium* (tuberculosis, leprosy, etc.), *Mycoplasma* (atypical pneumonia, etc.). |
| 10/3<br>10-11am | Online Module 2 | **Bacterial Toxins Review.** Botulinum toxin, Choleragen, Pertussis toxin, Tetanospasmin, pore-forming toxins, ADP-ribosylation, protein synthesis inhibitors |
| 10/4<br>10-12pm | Online Module 3 | **Bacterial Infectious Disease – Case Studies for Comprehensive Review *(STUDENTS WILL WORK INDEPENDENTLY THROUGH BLACKBOARD TO STUDY THIS MATERIAL):*** entry into the human body; adhesion, colonization & invasion; pathogenic actions of bacteria (tissue destruction, toxins, immunopathogenesis); mechanisms for escaping host defenses; spread of disease in populations, reservoirs of infection (human, animal, and non-living reservoirs), portals of entry and portals of exit, modes of transmission (contact, vehicles, vectors). |
| **10/7** | | **Exam 2** |

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| 10/10<br>10-11am | Lecture 15 | **Mechanisms of Viral Pathogenesis:** acquisition & infection of target tissue, cytopathogenesis (lytic & nonlytic, oncogenic viruses), host anti-viral defenses, immunopathology, epidemiology of viral diseases, (age, immune status & other host factors), control of viral spread. |
| 10/13<br>10-11am | Lecture 16 | **Viral Classification, Structure, & Replication – I:** basic characteristics and classification of viruses, virion structure (non-enveloped viruses, enveloped viruses), viral replication: overview, recognition & attachment to host cell, penetration. |
| 10/13<br>11-12pm | Lecture 17 | **Viral Classification, Structure, & Replication – II:** viral replication: uncoating, comparison ofDNA and RNA virus replication, assembly, and release from host cells. |
| 10/14<br>8-9am | Lecture 18 | **The Human Herpesviruses:** Herpesviridae—herpes simplex viruses (cold sores, genital herpes, encephalitis, etc.), varicella-zoster virus (chicken pox, shingles, etc.), cytomegaloviruses (congenital disorders), Epstein-Barr virus (mononucleosis, Burkitt's lymphoma) |
| 10/14<br>9-10am | Lecture 19 | **Parvovirus, Papillomaviruses, Polyomaviruses, & Poxviruses:** Papillomaviridae—human papilloma viruses (warts, benign tumors, cervical cancer, etc.); Polyomaviridae—BK virus (cystitis), JC virus (PML); Parvoviridae—B19 (fifth disease, aplastic crisis); Poxviridae—variola virus (smallpox), molluscipoxvirus (molluscum contagiosum), etc. |
| 10/17<br>10-11am | Lecture 20 | **GI viruses - Reovirus, Non-Respiratory Picornaviruses, Norwalk virus (Norovirus) and Hepatitis Viruses:** Reoviridae—rotaviruses (gastroenteritis), coltiviruses (Colorado tick fever); Picornaviridae—polioviruses (polio), Coxsackie viruses (meningitis, encephalitis, myocarditis, pericarditis, cold-like diseases, conjunctivitis, etc.), echoviruses (meningitis, encephalitis, exanthems, myocarditis, pericarditis, etc.); Norwalk virus (gastroenteritis); summary of hepatitis viruses. |
| **10/18** | | **Quiz 5** |
| 10/20<br>10-11am | Lecture 21 | **Retroviruses and HIV:** Retroviridae—HIV (AIDS) and HTLV (adult acute T-cell lymphocytic leukemia) |
| 10/21<br>8-9am | Lecture 22 | **The Respiratory Viruses I: Rhinovirus, Coronaviruses, Adenovirus:** Picornaviridae—rhinoviruses (common colds); Coronaviridae—coronoaviruses (common colds, SARS); Adenoviridae—adenoviruses (pharyngitis, conjunctivitis, cold-like infections, gastroenteritis, pneumonia, acute respiratory tract disease, etc.). |
| 10/21<br>9-10am | Lecture 23 | **The Respiratory Viruses II: Paramyxoviruses & Orthomyxoviruses:** Orthomyxoviridae—influenzaviruses (influenza, other respiratory infections, etc.); Paramyxoviridae—parainfluenzaviruses (cold-like diseases, croup, etc.), mumps virus (mumps), measles virus (measles); rubella virus (German measles); respiratory syncytial virus (colds, bronchitis, etc.); hantaviruses (hantavirus pulmonary syndrome, ARDS) |
| **10/25** | | **Quiz 6** |

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| 10/25<br>9-10am | Lecture 24 | **Rhabdoviruses, Togaviruses, Bunyaviruses, Other Miscellaneous Viruses & Prions:** Rhabdoviridae—rabies virus (rabies); hemorrhagic fever viruses; and prions (mad cow disease; vCJD). |
| 10/27<br>8-10am | Online Module 4 | **The Arboviruses and Rodent-Borne Viruses -** Caliciviruses—Flaviviridae—flaviviruses (encephalitis, dengue hemorrhagic fever, yellow fever, etc.); Filoviridae—Ebola & Marburg viruses (hemorrhagic fevers); Togaviridae—various encephalitis viruses (flu-like disease, encephalitis, etc.), Bunyaviridae—various encephalitis viruses (flu-like disease, encephalitis) ***STUDENTS WILL WORK INDEPENDENTLY THROUGH BLACKBOARD TO STUDY THIS MATERIAL*** |
| 10/28<br>8-10am | Online Module 5 | **Basic Biology of Parasites:** medical importance of parasites & parasitic diseases, classification & structure of protozoa (Sarcomastigophora, Ciliophora, Apicomplexa, Microspora), classification & structure of metazoa (helminths, arthropods), physiology & replication. ***STUDENTS WILL WORK INDEPENDENTLY THROUGH BLACKBOARD TO STUDY THIS MATERIAL*** |
| 10/31<br>8-9am | Lecture 25 | **Blood and Tissue Parasites:** most important parasites for North American physicians |
| 11/2<br>9-10am | Lecture 26 | **Review of Bacteriology and Virology** |
| **11/4** | | **Exam 3** |
| 11/8<br>10-11am | Lecture 27 | **Basic Biology of Fungi:** general characteristics, classification, medical importance of major fungal groups, fungal cell structure, fungal morphology, fungal replication, general information on fungal pathogenesis. |
| **11/15** | | **Quiz 7** |
| 11/15<br>11-12pm | Lecture 28 | **Superficial, Cutaneous & Subcutaneous Mycoses:** mechanisms of fungal pathogenesis, superficial mycoses (pityriasis versicolor, tinea nigra, black piedra, etc.), cutaneous mycoses (etiology, ecology & epidemiology, clinical manifestations), subcutaneous mycoses (lymphocutaneous sporotrichosis, chromoblastomycosis, phaeohyphomycosis, etc.). |
| 11/18<br>10-12pm | Lecture 29 | **Systemic and Opportunistic Mycoses:** histoplasmosis (reticuloendothelial cytomycosis), blastomycosis (Gilchrist's disease, North American blastomycosis), coccidioidomycosis, cryptococcosis, candidiasis (nail disease & disseminated infections), aspergillosis, zygomycosis, *Pneumocystis jirovecii* pneumonia. |
| **11/29** | | **Quiz 8** |
| 11/29<br>10-12pm | TBL 1 | **Pulmonary Pathogens I** Review of the pulmonary pathogens across organism groups using Team-Based Learning methods (TBL), consisting of an Individual Readiness Assessment Test (IRAT) and Group Readiness Assessment Test (GRAT). The IRAT and GRAT scores will not contribute to the overall course grading. |
| 12/2<br>10-12pm | TBL 2 | **Pulmonary Pathogens II** Review with cases illustrating the etiology & epidemiology of respiratory infections from all organism groups using the TBL methods described above. |
| **12/13** | | **Exam 4** |