

BMS 6302 – SYSTEMIC MEDICAL MICROBIOLOGY AND INFECTIOUS DISEASE

Course Syllabus – Spring 2008/2009

General Information

- Description:** Building upon the principles learned in General Medical Microbiology and Infectious Disease (BMS 6301), the medical student studies in detail infectious diseases in organ systems. The biological characteristics and pathologic mechanisms of infectious bacteria, viruses, fungi and parasites are covered. Functional and clinical implications are presented in the form of relevant clinical case examples that include the use of laboratory testing for diagnosis and treatment.
- Format:** Lecture/tutorial/case-based class sessions coordinated (by organ system) with BMS 6602 – Systemic Pathology & BMS 6402 – Systemic Clinical Pharmacology.
- Course Director:** David L. Balkwill, Ph.D.
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Office Hours: Open – students are welcome to stop by at any time or to make appointments in advance.
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- Required Text:** *Medical Microbiology, 5th Ed.* (2005) Murray, Rosenthal, and Pfaller, Elsevier-Mosby, ISBN: 0-323-03303-2. (NOTE: Students may also use the equivalent sections of the 4th edition of this text.)
- Recommended Text:** *Review of Medical Microbiology & Immunology, 9th Ed.* (2006) Levinson. Lange Medical Books/McGraw-Hill, ISBN: 0-07-110438-0.
- Alternative Review:** *Clinical Microbiology Made Ridiculously Simple, 3rd Ed.* (2004) Gladwin and Trarrler, MedMaster Inc., Miami, ISBN: 0-940780-49-6.
- Electronic Resources:** <http://www.cdc.gov/mmwr/>
Access Medicine/Harrison's Online (accessed through the COM Library home page)
Detailed information on weekly assignments, class schedules, coverage of exams, etc. will be posted on the Blackboard web site for this course. Copies of all handouts, summaries, Power Point tutorials, answers to the cases discussed in class, etc. will also be posted at this site.

E-books on the COM Library site:

Microbiology	Baron, Samuel	Medical Microbiology, 4th ed.	1996	NCBI Bookshelf (free)
Microbiology	Brooks, George F.	Jawetz, Melnick, and Adelberg's Medical Microbiology, 23rd ed.	2004	AccessMedicine
Microbiology	Kayser, Fritz H.	Medical Microbiology	2005	Thieme
Microbiology	Tilton, Richard C.	Microbiology: PreTest (USMLE Step 1) Self-Assessment and Review, 10th ed.	2002	NetLibrary (single user)

Topical Syllabus

Lecture/Tutorial/Clinical Case-Based Discussion Sessions

Session 01. Cardiovascular Diseases: endocarditis, myocarditis & pericarditis (various causative agents); rheumatic fever (*Streptococcus pyogenes*); syphilitic aortitis (*Treponema pallidum*); Chagas' disease (*Trypanosoma cruzi*); etc. – 2 hours.

Session 02. Respiratory Diseases – I: aspergillosis (*Aspergillus flavus* & *Aspergillus fumigatus*), coccidioidomycosis (*Coccidioides immitis*), mycoplasma pneumonia (*Mycoplasma pneumoniae*), influenza (influenza viruses), Q fever (*Coxiella burnetii*), hantavirus pulmonary syndrome (Sin Nombre virus), Legionnaires' disease (*Legionella pneumophila*) etc. – 2 hours.

Session 03. Respiratory Diseases – II: croup (parainfluenza viruses), nocardiosis (*Nocardia* spp.), *Mycobacterium avium* complex infections, respiratory syncytial virus infections, psittacosis (*Chlamydophila psittaci*), SARS – severe acute respiratory syndrome (SARS coronavirus), pneumococcal pneumonia (*Streptococcus pneumoniae*), tuberculosis (*Mycobacterium tuberculosis*), etc. – 2 hours.

Session 04. Urinary Tract Infections: categories of urinary tract infections; pathobiology, frequency & significance of urinary tract infections; cystitis (various causative agents); urethritis (various causative agents); pyelonephritis (various causative agents); prostatitis (various causative agents); renal calculi & abscesses; etc. – 2 hours.

Session 05. Bacterial Gastrointestinal Diseases: gastritis & peptic ulcer disease (*Helicobacter pylori*), infectious gastroenteritis & bacterial food poisoning (*Campylobacter jejuni*, *Clostridium botulinum*, *Clostridium difficile*, *Clostridium perfringens*, *Escherichia coli*, *Salmonella enteritidis*, *Bacillus cereus*, *Salmonella typhi*, *Shigella dysenteriae*, *Staphylococcus aureus*, *Vibrio cholerae*, *Vibrio parahaemolyticus*, etc.) – 2 hours.

Session 06. Viral & Parasitic Gastrointestinal Diseases: viral gastroenteritis (adenoviruses, Norwalk virus, rotavirus), protozoan gastrointestinal diseases (*Entamoeba histolytica*, *Giardia lamblia*, *Cryptosporidium parvum*, etc.), helminthic gastrointestinal diseases (*Ascaris lumbricoides*, hookworms, *Strongyloides stercoralis*, *Trichuris trichiura*, *Enterobius vermicularis*, *Schistosoma* spp., etc.) – 2 hours.

Session 07. Liver & Biliary Diseases: hepatitis (hepatitis viruses) & other viral pathogens that can affect the liver (yellow fever virus, Epstein-Barr virus, cytomegalovirus, etc.); parasitic pathogens that can affect the liver (*Entamoeba histolytica*, *Leishmania donovani*, *Ascaris lumbricoides*, *Toxocara* spp., *Fasciola hepatica*, *Schistosoma* spp., etc.) – 2 hours.

Session 08. Diseases of the Reproductive System: epididymitis (various causative agents), orchitis (viral & bacterial causative agents), cervicitis (*Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis*, *Candida albicans*, etc.), bacterial vaginitis, vulvovaginitis (*Trichomonas vaginitis*, *Candida albicans*, etc.), pelvic inflammatory disease (*Neisseria gonorrhoeae*, *Chlamydia trachomatis*), diseases involving genital sores or warts (*Treponema pallidum*, *Haemophilus ducreyi*, herpes simplex virus, human papilloma virus, etc.) – 2 hours.

Session 09. Infections of the Head & Neck: nose & face infections (skin infections, rhinoscleroma, ozena, etc.), common cold (rhinoviruses, coronaviruses, etc.), sinusitis (various causative agents), ear & mastoid infections (auricular cellulitis, otitis externa & media, mastoiditis), oral cavity infections (gingivitis, Vincent's angina, Ludwig's angina, cold sores, etc.), pharyngitis & laryngitis (various causative agents), etc. – 2 hours.

Session 10. Hematopoietic Infections: sepsis, systemic inflammatory response syndrome (SIRS) & septic shock (various causative agents); malaria (*Plasmodium* spp.); babesiosis (*Babesia* spp.); fifth disease & aplastic crisis (parvovirus B19); cervical lymphadenitis (various causative agents), cat scratch disease (*Bartonella henselae*), visceral leishmaniasis (*Leishmania donovani infantum*), brucellosis (*Brucella melitensis*), etc. – 2 hours.

Session 11. Diseases of the Bones & Joints: hematogenous & non-hematogenous osteomyelitis (various causative agents); infectious arthritis (*Neisseria gonorrhoeae* & other agents); specialized forms of arthritis: Lyme disease (*Borrelia burgdorferi*), secondary syphilis (*Treponema pallidum*), mycobacterial arthritis (*Mycobacterium tuberculosis*); arthritis caused by viral & fungal agents; etc. – 2 hours.

Session 12. Diseases of the Central Nervous System – I: acute bacterial meningitis (various causative agents), viral meningitis (various causative agents), rabies (rabies virus), Creutzfeldt-Jakob disease (prion protein), encephalitis (various causative agents), etc. – 1 hour.

Session 13. Diseases of the Central Nervous System – II: brain abscesses (various causative agents), progressive multifocal leukoencephalopathy (JC virus), poliomyelitis (polio virus), neurocysticercosis (*Taenia solium*), shingles (varicella zoster virus), cerebral toxoplasmosis (*Toxoplasma gondii*), etc. – 2 hours.

Session 14. Ophthalmic Diseases: conjunctivitis, keratoconjunctivitis, keratitis, endophthalmitis, uveitis & posterior uveitis (various causative agents); pharyngeal conjunctival fever (adenovirus); trachoma (*Chlamydia trachomatis*); etc. – 1 hour.

Session 15. Bacterial & Viral Diseases of the Skin: folliculitis, furuncles, carbuncles, bullous impetigo & scalded skin syndrome (*Staphylococcus aureus*); nonbullous impetigo & scarlet fever (*Streptococcus pyogenes*); Rocky Mountain spotted fever (*Rickettsia rickettsiae*); acne (*Propionibacterium acnes*); leprosy (*Mycobacterium leprae*); cellulitis (various causative agents); anogenital & skin warts (human papilloma virus), rubella (rubella virus), chickenpox & shingles (varicella zoster virus), cold sores & herpetic whitlow (herpes simplex virus), smallpox (variola

virus), fifth disease (parvovirus B19), hand-foot-and-mouth diseases (Coxsackie virus), etc. – 2 hours.

Session 16. Fungal & Parasitic Diseases of the Skin: blastomycosis (*Blastomyces dermatitidis*), coccidioidomycosis (*Coccidioides immitis*), histoplasmosis (*Histoplasma capsulatum*), tinea infections (various dermatophyte fungi), sporotrichosis (*Sporothrix schenckii*), cutaneous leishmaniasis (*Leishmania* spp.), Swimmer’s itch (*Schistosoma* spp.), etc. – 1 hour.

Evaluation of Student Performance and Grading

The material for examinations and quizzes will come from the lecture/tutorial/case-based discussion sessions, the full answers to the cases discussed in these sessions, the handouts that summarize the microbiology for each organ system covered in the course, materials on the Blackboard site for the course, and the appropriate sections of the textbook. The format for written examinations will be multiple choice questions (single best answer).

There will be five integrated block examinations in the Spring semester. These examinations will cover material in all the courses for the four weeks prior to each examination. The microbiology part of these examinations will consist of 12 to 18 questions, depending on the amount of material covered during each examination period. At the end of the semester, there will be a comprehensive final examination that covers all of the material presented during the second year of the medical curriculum. There will be six quizzes (5 points each), which will occur at the beginning of selected class sessions (see the Class Schedule for 2006-2007 and the Assignments section of the Blackboard site for the course). The final grade in the course will be based upon the total score calculated from the total number of points as follows:

82 questions (total) on the five integrated block examinations	=	82 points
25 questions on the comprehensive final examination	=	25 points
30 questions on quizzes	=	30 points
Total	=	137 points

Grading for the course is based on a numeric score calculated as a percentage achieved from all possible points, as follows:

A = > 90% correct	C = 70-76.9% correct
B+ = 87-89.9% correct	D = 65-69.9% correct
B = 80-86.9% correct	F = < 64.9% correct
C+ = 77-79.9% correct	

Attendance, Remediation, and Other College of Medicine Policies

COM Attendance Policy – Philosophy:

We believe that:

Professionalism is a major component of our medical curriculum. We believe students should conduct themselves appropriately in the various educational activities of the curriculum. This conduct includes coming to educational activities on-time, using the laptop computers only for course work during the educational activity, and not disrupting the class if late. The faculty should also demonstrate professionalism, by starting and ending all scheduled educational activities on time and providing a course schedule with clearly explained course policies in the course syllabus. Any changes in the schedule should be given to the students in a timely manner.

Students will be accountable and personally responsible for attending all educational activities (small groups, labs, clinical experiences, examinations, lectures, computer sessions, etc.).

Unexcused absences reflect negatively on the goals and objectives of the medical curriculum and demonstrate unprofessional behavior by the respective student.

We owe it to our state legislature and the citizens of the State of Florida to provide a quality educational program that meets the needs of our students in preparing them for the M.D. degree.

Attendance Policy

Students are expected to attend all scheduled activities. Students are expected to be on time. Being on time is defined as being ready to start at the assigned time. If a student has an emergency that prevents her/him from attending a scheduled activity, s/he is to call and notify the Office of Student Affairs (Year 1/2) or the Regional Campus Dean / Student Support Coordinator (Year 3/4) and request that they inform the supervisors/professors/clerkship faculty/education director for that activity. If at all possible, the student should also call and at a minimum, leave a message with one of the course/clerkship directors. It is important that students realize that their absence or tardiness negatively impacts a number of other people. Attendance, including tardiness, is part of the student's evaluation for professionalism. Negative evaluations may result in decreased grades and in severe cases, referral to the Student Evaluation and Promotion Committee.

Procedure for Notification of Absence

Year 1/2

If the student knows in advance of an upcoming legitimate absence, the online “Advance Request for Absence from Educational Activity(ies)” process should be followed as outlined below.

If the absence occurs due to an unforeseen emergency, the student should contact the course director and the Associate Dean for Student Affairs immediately to report the absence including the reason for the absence.

The implications for the absence (e.g., remediation, course grade adjustment, make-up exam, etc.) will be given to the student by the course director and final decisions regarding these actions shall rest with the course director.

The online “Request for Absence” process should be used for all absences, including post-illness absences, regardless of whether the student is requesting an absence from one or more classes or the entire day. Here is how it works.

- 1) Student completes online form: <https://apps.med.fsu.edu/absence>
(Form will only work in Internet Explorer)
- 2) The form is routed to student affairs for approval then to appropriate Course Directors/Instructors
- 3) Course Directors will approve/deny request
- 4) Students can check on the status of the progress of the request by clicking on the “Pending requests” link, where they will be able to see if the instructor(s) has taken action on the form.
(If the instructor has not taken action within 24 hours, students can contact him/her directly to let him/her know that the request is pending.)
- 5) The student will receive an email indicating whether the request has been approved or denied.

Students must include all the courses/activities they plan to miss on the requested day of absence (lecture, small groups, quiz, exam, OSCE, etc.) If students plan to be gone the entire day and fail to include an activity/class on the form, they will NOT be excused from that particular activity/class. It will be considered unexcused. It is the students’ responsibility to ensure the form is filled out completely with all the courses/activities they will miss for that particular day.

If a student’s request has been denied, the email will not indicate the reason nor indicate which instructor denied the request.

Some reasons that are likely to automatically disqualify an advance request are: exams, CLC sessions and OSCEs -- unless it is for extreme circumstances (illness, family emergencies, etc).

**Remediation Policy for Absences from Examinations, Quizzes,
Small Group Sessions, Preceptor visits, and Clerkship Call:**

The remediation policies for absences from examinations, quizzes, small group sessions, and clerkship call are:

1. **POLICY ON MISSED EXAMINATIONS:** Students are required to take major in-term and final examinations. Based on Curriculum Committee policy, a student can only be excused from an examination by a course/education director decision based on the personal situation of the student. The Course/Education Director will determine the time of the exam make-up session. Also, according to the Curriculum Committee decision and the existence of the FSU COM honor code, the student will be given the same examination given to the other students. *In this course (BMS 6302), all examinations must be made up within one week of returning to class.*

2. **POLICY ON MISSED QUIZZES:** Students are required to take scheduled and unscheduled quizzes in the courses/clerkships. A student can only be excused from a quiz by a Course/Education Director decision based on the personal situation of the student. The student must make arrangements with the Course/Education Director to make up a missed quiz. Also, according to the curriculum committee decision and the existence of the FSU COM honor code, the student will be given the same quiz given to the other students. *In this course (BMS 6302), all quizzes must be made up within one week of returning to class.*
3. **POLICY ON MISSED SMALL GROUP SESSIONS, PRECEPTOR VISITS, AND CLERKSHIP CALL:** The student should contact the Course Director, small group leader, Clerkship Director or Education director for instructions on remediation of the missed session and material covered.

Academic Honor Code:

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://www.fsu.edu/~dof/honorpolicy.htm>).

Students With Disabilities:

The Florida State University adheres to Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (ADA) in prohibiting discrimination against any qualified person with a disability. Students with specific questions regarding the FSU policies governing students with disabilities may contact the Student Disability Resource Center.

Students with disabilities who wish accommodations based on a disability must notify the College of Medicine Office of Student Affairs and register with the FSU Student Disability Resource Center (SDRC). In order to register with the SDRC the student must provide the Center with the required documentation. A definitive diagnosis of disability must be stated in the documentation. Details regarding the required documentation for each disability can be found at the SDRC website www.fsu.edu/~staffair/dean/StudentDisability.

Exam Protocol for Students with Disabilities at FSU College of Medicine

The Florida State University adheres to Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (ADA) in prohibiting discrimination against any qualified person with a disability. Students with specified questions regarding the FSU policies governing students with disabilities may contact the Student Disability Resource Center (SDRC).

Students who warrant accommodations based upon the functional effects of a physical or learning disability should adhere to the following procedure:

1. Student meets with a representative of the Student Disability Resource Center (SDRC), provides documentation of a disability and requests accommodations. (A definitive diagnosis of a disability must be identified in the documentation. Details regarding the required documentation for each disability can be found at the SDRC website: www.fsu.edu/~staffair/dean/StudentDisability.)
2. For entering students, this is best accomplished prior to the beginning of classes (e.g., Orientation Week). For all other students, it must be completed at least one month prior to the examination date when accommodations would be instituted.
3. SDRC staff will review the documentation to determine sufficiency and eligibility for accommodations. If additional documentation is needed, this may be obtained through the Office of Student Counseling Services (OSCS) at the COM or elsewhere in the community. If additional testing is required, temporary accommodations may be granted while documentation is completed.
4. Student and SDRC staff identifies the type of accommodations that are appropriate based upon the student's disability.
5. SDRC staff completes and signs a Faculty Letter addressed to the COM's Associate Dean for Student Affairs indicating that documentation supports specific accommodations.
6. Student signs Faculty Letter indicating agreement with suggested accommodations and understanding of his or her responsibility to present the letter to the Associate Dean for Student Affairs at the College of Medicine.
7. SDRC prints two copies of the Faculty Letter and retains a copy as a record of the initial meeting, eligibility and accommodation request.
8. Student will schedule an appointment to meet with the Associate Dean for Student Affairs within one week's time to present the second original Faculty Letter. The student is also encouraged to keep a copy of this document.
9. The Associate Dean for Student Affairs will review the letter, determine appropriateness of all requests based on the requirements for the college, and discuss concerns with student and/or call SDRC when appropriate.
10. The letter will be kept in a confidential place in the Office of Student Affairs and not made part of the academic record of the student.
11. Once accommodation have been confirmed, the student is to schedule an appointment with the OSCS.
12. The OSCE's at the COM will be the representative responsible for facilitating accommodations for medical school students who have been determined eligible for services. The OSCS will explain to the student how the accommodations will be facilitated.

13. The student will then be responsible for completing the SDRC Exam Sign-Up Sheet and ensuring that his/her Year 1/Year 2 Year and Course Directors overseeing the examination have signed it. Exam Sign-Up Sheets may be obtained from year 1/Year 2 Coordinators or the OSCS.
14. The student will return the completed SDRC Exam Sign-up Sheet to the SDRC at least **5 WORKING DAYS** prior to the scheduled date/time of the exam in order to facilitate testing/exam accommodations. Failure to meet this requirement will release the COM and SDRC from the responsibility of providing accommodations for that particular examination.
15. A special situation arises with the NBME examinations. Since these examinations need to be ordered well in advance of the test date, students who are requesting to take an NBME under special accommodations should complete the Exam Sign-Up sheet at **least 4 weeks** prior to the date the exam is to be administered.
16. Students who qualify for exam accommodations will follow SDRC's Testing Center policies. If the examination is not taken at the SDRC, the COM (in collaboration with SDRC) will coordinate the provision of other accommodations. This might occur for quizzes or shorter, in-class exams. The student is responsible for notifying the instructor at least five working days prior to the quiz/exam if on-site accommodations are desired. Except for extenuating circumstances, all Year1/Year2 integrated and Year1/Year2 NBME exams requiring accommodation will be administered at the SDRC.
17. For those students attending the regional campuses, Steps 1- 11 should be followed in order to be approved for accommodations. However, the Regional Campus Dean will be responsible for overseeing the implementation of the accommodations in collaboration with the Associate Dean for Student Affairs.
18. Provision of exam proctors and appropriate distribution of exams for students receiving accommodation will be administered by the Office of Medical Education (for Year 1/2 and the Regional Campus Deans (Year 3/4).

Evaluations

Student evaluations throughout the course are an important way of improving medical education, particularly during the founding years of the College of Medicine. Not only are your comments and suggestions valued, but the evaluation process represents one way for you to become familiar with the peer review process. Peer review is an important quality management function in all branches of medicine. In order for peer review to work properly, it must be taken seriously by both the evaluators as well as those being evaluated. Therefore, we ask that you give careful consideration to evaluations. When making comments, consider what you would say if you were face to face with the person to whom the comments are directed. How would you react if the comments were directed at you? Give thought to how learning resources were used in regard to the way to learn best. What worked for you and what did not? How is your time used optimally? Are you making adequate progress? Are you being challenged to improve? Be specific. Ultimately, your use of the evaluation process can help you learn how to improve your own medical practice.

Course Objectives

Knowledge

- Expand the knowledge base of principles of microbial taxonomy, structure, physiological function, and pathogenesis.
- Expand the vocabulary for describing the taxonomy of microbial organisms and the diseases they produce.
- Expand their understanding of the various mechanisms by which different categories of microorganisms cause disease and its related signs and symptoms in the human body.

Skills

- Demonstrate the ability to use the laboratory to diagnose infections, including appropriate specimen collection, ordering of tests, and interpretation of test results in the context of the patient's presentation and findings.
- Demonstrate the ability to form differential diagnoses for infectious diseases in each organ system.
- Demonstrate knowledge of general categories of therapeutic modalities available to treat infections.
- Demonstrate knowledge of the effect of age on the types of infections seen in the life-cycle, including those seen in perinatal, pediatric, and geriatric patients.
- Demonstrate problem solving ability and diagnostic reasoning with infectious diseases.
- Demonstrate knowledge of clinical manifestations in the history and physical examination that point to infection.
- Demonstrate the ability to correlate microbial infection with radiologic imaging findings.
- Demonstrate knowledge of public health surveillance and measures to deal with infections in a population.

Attitudes/Behaviors

- Demonstrate professional attitudes and behaviors towards others.

Integration with COM Goals and Objectives

Knowledge

- Demonstrate the application of the scientific bases of health, disease, and medicine to common and high impact medical conditions in contemporary society.
- Describe the development, structure and function of the healthy human body and each of its major organ systems at the macroscopic, microscopic, and molecular levels.
- Recognize and discuss the implications of altered structure and function (pathology and pathophysiology) of the body and its major organ systems that are seen in various diseases and conditions.

- Identify changes in the structure and function of the human body associated with the aging process and be able to distinguish normal changes associated with aging from those that denote disease.
- Describe the molecular basis of diseases and maladies and the way in which they affect the body (pathogenesis).
- Demonstrate the ability to use basic biobehavioral and clinical science principles to analyze and solve problems related to the diagnosis, treatment, and prevention of disease.
- Describe strategies to support life long learning via both print and electronic sources to assist in making diagnostic and treatment decisions (e.g., practice guidelines) and to remain current with advances in medical knowledge and practice (e.g., medical information data bases).

Skills

- Demonstrate the appropriate use of laboratory tests and radiographic studies in making diagnostic and treatment decisions.
- Demonstrate the ability to evaluate the patient's medical problems and to formulate accurate hypotheses to serve as the basis for making diagnostic and treatment decisions.
- Demonstrate the ability to acquire new information and data and to critically appraise its validity and applicability to one's professional decisions, including the application of information systems technologies for support of clinical decision-making.
- Demonstrate the ability to organize, record, research, present, critique, and manage clinical information.
- Demonstrate the ability to communicate compassionately and effectively, both verbally and in writing, with patients, their families, colleagues and others with whom physicians must exchange information in carrying out their responsibilities.
- Demonstrate the ability to work effectively as part of a health care team, with appreciation for the multiple contributions of other health care professionals and agencies to the health of the individual and the health of the community.

Attitudes/Behaviors

- Demonstrate professionalism and high ethical standards in all aspects of medical practice, specifically competence, honesty, integrity, compassion, respect for others, professional responsibility and social responsibility.
- Demonstrate awareness of the health care needs of aging patients and a willingness to care for the elderly.