School of Medicine Curriculum

In 2010, the UMMS launches its new Learner-centered Integrated Curriculum (LInC), based on a new vision and principles to guide the training of 21st century physicians. Designed with input from over 400 faculty and students, LInC incorporates innovations in teaching and learning as well as new national standards for medical education. The educational program at UMMS is designed to develop six foundational competencies required of all physicians: professional, scientist, communicator, clinical problem solver, patient and community advocate, and person. Grounded in these required core competencies, the UMMS educational program prepares students for their future medical careers regardless of specialty choice, while maintaining our founding commitment to prepare students for training in the primary care disciplines. Our philosophy values partnership between students and faculty in teaching and learning; respect and dignity in the physician-patient and student-learner relationship; and an educational milieu of collegiality, collaboration and diversity.

Our curriculum emphasizes early patient care exposure from the first weeks of medical school; strong clinical skills development in communications, clinical problem solving and professionalism; student activism in community service and advocacy; diverse opportunities for research and promotion of lifelong learning skills. Learning communities, which bring together small groups of students and faculty across class years for formal and informal teaching and mentoring, are a featured highlight of our comprehensive curriculum redesign. Educational methods promote active scholarship and engaged, interactive learning, with hands-on practice under the close observation of faculty. As a supplement to students’ learning in the clinical setting, our nationally recognized Standardized Patient Program and UMMS Simulation Center provide opportunities for ongoing practice, improvement and mastery of essential clinical skills. Our courses and clerkships are continuously enhanced and renewed, to keep pace with the rapidly changing science of medicine, evolving standards of professional medical practice, and state-of-the-art educational methods and technologies.

Foundations of Medicine, Years 1 (FOM1) and 2 (FOM2)

The first two years of the educational program provide the essential foundations of the medical sciences, clinical skills and professional values to serve students’ lifelong learning needs and career paths as physicians. The curriculum emphasizes current advances in the life sciences; applications and clinical correlations to patient care; integration of content across years and courses; opportunities for self-directed, independent study; teaching and learning in teams; and cross-disciplinary teaching models that engage clinicians, basic scientists and the broad spectrum of health professions trainees in nursing, the social sciences, public health and the allied health professions. Grading for FOM1 is pass-fail with more traditional grading introduced in FOM2.

Students begin FOM1 with a Transition to Medical School curriculum, which acclimates entering students to the medical school structure by attending to their intellectual, social and emotional needs in preparation for the academic rigor of medical education. Topics include an orientation to Worcester, and to the medical school’s student support resources, introductions to learning communities, professionalism, and strategies for learning and test-taking. This transitional curriculum culminates in basic life support certification, preparing students to act as first responders. The Doctoring and Clinical Skills (DCS) course, which runs throughout both FOM1 and FOM2, utilizes learning communities as the primary mechanism for supporting student engagement in personal and professional development and lifelong learning through a skill-based curriculum with faculty mentors who foster long-term relationships with students throughout their medical school experience. Primary content offered in DCS during FOM 1 includes: the medical interview, communication in medicine, physical examination, clinical reasoning, professionalism, and medical ethics. More specific applications include: reinforcement of basic science content from the clinical perspective, oral presentations, working in teams, physician (and student) as teacher, application of appropriate evidence-based medicine, cultural diversity in patient care, determinants of health, health care systems, and balancing personal and professional life.
This longitudinal, multi-component course encompasses more than 300 hours of required curriculum time across FOM1 and FOM2, and draws upon approximately 300 faculty. The course has three main components: DCS small groups, in which students meet regularly with two faculty facilitators to acquire skills in course competencies; and two practice laboratory components: the Longitudinal Preceptorship Program (LPP), and the Physical Diagnosis course (PD). LPP places students in the clinical setting beginning in the first weeks of medical school, providing the opportunity to interact with patients under the supervision of an assigned faculty physician preceptor. Diverse preceptorship sites are available, including urban, rural, and underserved settings. Students attend LPP sessions an average of every other week during the first two years, first “shadowing” their assigned preceptor, then actively practicing clinical skills introduced in DCS small groups. In the Physical Diagnosis (PD) component, the principles of the normal and abnormal physical examination are taught and practiced, providing opportunities for early hands-on practice of physical exam skills with standardized patients and subsequently with patients at varied clinical sites across Worcester county and neighboring towns to the north, south and west, within an hour’s drive from the medical school.

UMMS learning communities are composed of ‘houses’ into which students are randomly assigned on enrollment, and dedicated faculty educators and mentors selected for their exceptional teaching, as well as personal and professional characteristics. Learning communities are designed to enhance the quality of student-teacher and student-student relationships by developing longitudinal interactions between students, faculty and peers from other classes throughout the four-year educational program. This model improves continuity of teaching doctoring and clinical skills, supports interactive and small group teaching, fosters students’ self-directed learning, and develops students’ skills in formal and informal peer teaching and mentoring.

The first biomedical science course, Building Working Cells and Tissues (BWCT), introduces and applies key principles of biochemistry, histology, physiology, carbohydrate metabolism, and cellular genetics to an understanding of how cells and tissues are built, and how they work. The course is structured to initiate clinical thinking processes, promoting the application of scientific knowledge to solving medical problems. BWCT makes extensive use of cases to illustrate clinical aspects of basic scientific concepts, and features collaborations between basic scientist and clinician faculty to illustrate these topics.

In addition, LinC expands the popular Integrated Case Exercises (ICE) program to a longitudinal two-year experience, drawing content from all FOM1 and FOM2 courses. ICE provides structured opportunities for students to apply their foundational knowledge to guided clinical problem-solving. The program engages basic scientists and clinicians to teach together interactively, emphasizing the relevance and application of basic sciences to clinical care, and integrating content from anatomical, physiological, biochemical, genetic, epidemiological and human (patient/family) perspectives. Other longitudinal content areas include Nutrition, Aging, and Evidence-based Medicine.

Our Principles of Genetics (PoG) course recognizes the critical role of genetics in current and future medical research and practice, and runs concurrently with and complementary to BWCT. The PoG course focuses on essential genetics principles that provide a foundation for further learning in other FOM courses as well as in the core clinical experiences. Specific content includes: basic cellular and molecular genetics and clinical application in areas such as chromosomal abnormalities, genetic diseases, the human genome project, reproductive genetics, cancer genetics, genetics of aging, gene therapy, stem cells and cloning. The course will highlight contemporary ethical, legal and social issues of genetic privacy, the genetic non-discrimination act, and hot topics such as epigenetics and “personalized medicine” based on genetic variants.

These courses build the foundation for Development, Structure and Function (DSF), a course that examines how the human body develops and how it works, by presenting an integrated view of anatomy, histology, physiology, embryology and growth. This course emphasizes both the regional and systemic approaches to human biology and medicine, and applies patient cases and clinical imaging in an integrated learning experience that models the clinical-reasoning of real medical practice. DSF is organized into two highly inter-related blocks. The first block presents detailed physiological function, enhanced by
Curriculum links to prosections, microscopic anatomy/histology, clinical imaging and case presentations organized into sections covering cardiovascular, respiratory, renal, gastrointestinal, endocrine, and reproductive systems. This is followed by a block focusing on regional anatomic dissection with related microanatomy/histology, clinical imaging, and case presentations allowing students to reinforce and build their knowledge. Embryology and development are presented throughout the course as a self-study online tutorial and reinforced with regular case presentations tied to current topics.

The course offers exceptional learning experiences including cadaver dissection in small groups in our state-of-the-art anatomy labs with pull-down, cadaver-side computers and online interactive dissectors for each table; an anatomy resource center; an introduction to surgery, and clinical procedural demonstrations. Supplemental activities draw on the medical humanities, including presentations on the history of human anatomy, discussions of death and dissection, and an annual student-led memorial service honoring UMMS anatomical gift donors.

In addition to Principles of Genetics, two other courses—Principles of Pharmacology (PoP) and Cancer Concepts (CC)—present a similar model of learning that teaches essential principles which are subsequently applied in other courses throughout all four years of the curriculum. The PoP course introduces basic pharmacology principles and concepts, such as drug development and regulation, pharmacodynamics, pharmacokinetics, drug metabolism and neuroeffector systems. The course emphasizes how basic pharmacology principles impact treatment decisions, using of clinical vignettes and case studies co-taught by clinicians and basic scientists, who together integrate basic principles into applied patient care. Cancer Concepts is a case-based course which features a combination of lectures and small group sessions, covering the basic pathophysiology of malignancy. Each “cancer concept” is introduced or related back to one or more specific clinical cases. Students discuss assigned readings and participate in virtual laboratories, offering high-resolution digitized pathology “slides” and three-dimensional anatomic displays of various malignancies to understand cancer at the cellular, tissue, organ and organism levels. Introductions are provided to the three clinical disciplines of oncology, (radiation oncology, surgical oncology and medical oncology), as well as the epidemiology and societal implications of cancer.

FOM1 ends with two seamlessly integrated courses: Host Defense and Blood (HDB), and Infections (Infx). HDB provides an integrated overview of bone marrow, peripheral blood and inflammation, and the major pathologic disorders in hematology and immunology, including autoimmune diseases and hematologic malignancies. Teaching includes on-line learning modules, virtual microscopy exercises, and student-led clinical case discussions and problem-solving sessions. The specific focus is on building students’ basic science knowledge of the interactions between the blood and immune systems, and applying HBD principles to clinical data and problem solving in hematologic and immune disorders. The Infections (Infx) course includes the host response to and its defense mechanisms against infections, facilitating a close integration with the HDB course. Infx is taught from the global perspective of the infectious agents and diseases affecting our world and its inhabitants across all living organisms (from human to animal to microbe), diverse human populations, and disparate environments. This course deals with the laboratory aspects, structure, and pathogenic mechanisms of infectious agents that cause disease across populations and the developmental continuum from conception, through childhood, and the aging adult. Infectious agents are presented in the context of epidemiologic (population health) factors including the psychological and social implications of various infections and the need for cultural competence in providers. The principles of the Infx course are linked to specific content in Foundations of Medicine 2 (FOM2) organ-based blocks, correlating infectious disease pathology with microbial properties, presenting signs and symptoms, and differential diagnosis and treatment.

To help students synthesize the FOM1 content, our FOM2 Organ Blocks (Org) curriculum is introduced through its first critical organ block (cardiovascular), prior to the summer break and students’ pursuit of summer activities. The entire FOM2 curriculum, which resumes after the summer break, covers a total of seven major organ systems (cardiovascular, renal, respiratory, digestive, reproductive, endocrine, musculoskeletal). Each FOM2 Organ Block follows similar structural and teaching principles, and for each organ system, covers the advanced physiology and pathophysiology, as well as relevant pharmacology,
infections, cancers, doctoring skills and clinical cases. Teaching includes relevant basic science and clinical integration with faculty from multiple departments collaborating in lectures, case presentations and discussions. Students develop an in-depth understanding of disease by correlating underlying molecular and physiologic mechanisms with structural, functional and clinical manifestations, as well as learning initial approaches to diagnosis and management. Multi-system course components bridge individual organ blocks through interactive problem-solving sessions based on clinical cases. These sessions allow students to interact directly with faculty to solve clinical problems while integrating curriculum content across organ systems.

LinC includes a course focusing on the Determinants of Health (DoH), which includes community and population health, addressing the impact of community, culture and medical care systems on health, and the quantitative health sciences, which include epidemiology and biostatistics. There is an emphasis on applying DoH principles to clinical care, screening, diagnosis and treatment of disease, and the role of physicians as advocates for individuals and populations within a multidisciplinary healthcare team. The course engages students in a community health clerkship experience, placing them in diverse sites across the commonwealth to enhance their understanding of the importance of the community context in health and healthcare. These immersion experiences focus on underserved populations and application of curricular principles to real-life community settings. Students focus on the problems and services among diverse racial, ethnic and cultural groups, gay, lesbian, bisexual and transgender patients, poor families, patients with HIV/AIDS, persons dealing with substance abuse, older adults, the homeless, people with developmental disabilities, abused children, and incarcerated patients.

The Brain: Nervous System and Behavior (BNB) is another major FOM2 course that runs concurrently with Org. The course presents disorders of the nervous system and behavior as disorders of the ‘whole person’, and takes into account genes, neurological substrate, behavior, environment, and impact on the person and society. Structured as three concurrent tracks (psychiatry and behavioral science, neuroanatomy and neurophysiology, neuropathology and neurology), the course anchors teaching in clinical disorders and syndromes including stroke, traumatic neurologic injury, depression, pain and memory loss. While integrating relevant pharmacology, infectious diseases and malignancies, the course emphasizes clinical problem solving and content relevant to general medical practice.

FOM2 culminates in an experience titled Patients, which links self-assessment and formative assessment to selected multisystem problems and common and urgent clinical presentations, in order to help students synthesize the learning in FOM1 and FOM2, as well as helping students identify areas for specific focus in clinical learning. LinC allows ample time for preparation and completion of Step I of the U.S. Medical Licensing Exam (USMLE), which is required for licensure and for graduation from UMMS. The FOM 2 curriculum offers interested students the opportunity to participate in a comprehensive board review course for USMLE Step I through the Center for Academic Achievement. Multiple self-assessment opportunities and simulated USMLE experiences are available through the use of boards-type questions and online USMLE-designed course-related tests.

Core Clinical Experiences (CCE)

Students enter their Core Clinical Experiences by mid-May of the 2nd year of medical school, allowing an earlier start to the clinical clerkships and enhanced flexibility and individualized exploration of clinical disciplines. In this model, students may choose elective experiences as early as spring of their third year of medical school, promoting more choice in the third year clerkship experiences and earlier electives for career exploration. Advancement from FOM2 to Core Clinical Experiences represents a critical transition in the educational program as students enter the hospital wards, ambulatory clinics and physician offices and serve as participating members of health care teams providing direct care to patients and their families. Under faculty guidance and supervision, core clinical students actively apply the principles of clinical medicine to patient care, acquire essential technical skills, and further develop personal and professional values to enable them to serve as caring, competent and compassionate physicians. The CCE begins with the Transition to the Core Clinical Experiences, a curriculum designed to provide hands-on training and
exposure to essential information and introductory skills to promote students’ successful transition to their clinical rotations. This curriculum features small group sessions to review core clinical skills such as x-ray and EKG interpretation, heart, neurologic and musculoskeletal exam skills, basic life-support (BLS) recertification, and procedures such as blood drawing. Also featured are presentations on important healthcare systems topics, such as utilizing electronic medical records, infection control, quality improvement and patient privacy.

Students begin their third-year core clinical rotations, which feature experiences in six required disciplines: medicine, surgery, family medicine, obstetrics & gynecology, pediatrics, and psychiatry. These core clinical experiences focus on hands-on mentored, experiential learning, and are structured to include basic science content, a cross-disciplinary longitudinal curriculum, and interdisciplinary and interprofessional experiences. The resources of the UMass standardized patient program and simulation center provide state-of-the-art educational technologies to support ongoing clinical skills training, practice and mastery, throughout the clinical years.

The Internal Medicine experience includes significant opportunities to work and learn in the acute care, inpatient setting with students rotating at our University Hospital and at one of our community-based educational affiliates, as well as immersion in the ambulatory care setting in a community physician’s office. In addition to the general wards, student’s self-select experiences with any of the medical subspecialties to broaden knowledge of diseases cared for by these specialists and characteristics of the profession. Students learn to diagnose and manage the major illnesses of adults of all ages as well as the principles and practice of health promotion and disease prevention. Essential skills in history-taking, clinical problem solving and physical examination are developed through hands-on practice and direct observation and feedback from faculty and standardized patients. The Internal Medicine clinical curriculum emphasizes an appreciation of the impact of illness on the patient, physician and society; the importance of professionalism and professional development; rapid and effective access to information; ways to assure patient safety; and the use of evidence-driven approaches to the diagnosis, management and prevention of disease. Students explore ethical dilemmas and issues surrounding the end of life and examine transfers of care between hospital and community settings. The core clinical experience utilizes the school’s on-line classroom system and a nationally-developed case-based online curriculum to present course content at times convenient to students, allowing them fewer interruptions to time with their patients. In addition, each student is paired with a Longitudinal Preceptor for Medicine (LPM) who meets with a small group of students weekly to review clinical cases, skills and personal and professional issues.

Pediatrics allows students to participate in the care of infants, children and adolescents in the ambulatory, inpatient and nursery settings. Students become familiar with primary care and subspecialty pediatrics and the important role of the pediatrician in children’s physical and emotional development. They acquire basic knowledge of normal growth and development, as well as common pediatric acute and chronic illnesses. In the ambulatory component of the curriculum, students are members of a health care team in a community-based office, supplemented with experiences in the pediatric emergency department, newborn nursery, and patient home visits. During the inpatient component, students rotate in an acute care hospital caring for hospitalized children. Students develop competency in the physical examination of infants, children and adolescents; acquire an understanding of the influence of family, community and society on a child’s health; and develop strategies for health promotion. Throughout the pediatrics clinical curriculum, students actively participate in the health care of pediatric patients and their families, developing and refining their communication/interviewing skills and clinical problem-solving skills. All conferences are in a Case Method Teaching format, facilitating student/preceptor discussion, critical thinking, and development of problem-solving skills. The experience is supplemented by a computer-based learning program that allows students to participate in the care of interactive virtual patient cases designed to cover areas of the core curriculum.

Clinical experiences with faculty from the Department of Family Medicine and Community Health give students broad exposure to the principles and practice of family medicine. Students work one-on-one with an assigned community-based faculty preceptor, seeing and following patients in the office setting. This format provides students with a continuity of care experience, in which the health care needs of patients and their
families are managed over time. An innovative curriculum based on the virtual “McQ” family is conducted at the medical school, where students work in small groups to manage the health care needs of this simulated three-generation family. Core curricular objectives include prenatal care management, common childhood illness, adolescent issues, health maintenance and disease prevention across diverse age groups, and evidence-driven management of common diseases encountered in the ambulatory setting. Additionally, students participate in online curriculum programs, as well as hands-on curriculum in evidence-based medicine.

**Obstetrics & Gynecology** provides students with clinical experiences in women’s health care in inpatient and ambulatory settings, located at large tertiary referral centers and smaller community hospitals. Formal didactic and clinical sessions are interwoven to help students develop interviewing, physical examination, and diagnostic and management planning skills. The Ob/Gyn clinical curriculum focuses on a variety of areas related to women’s health across the life cycle, including family planning, prenatal care, normal and abnormal labor management, gynecologic surgery, cancer screening and treatment, menopausal issues, and assessment and management of pain, infection and bleeding. Additional content includes: explorations of legal and ethical issues related to women’s health care; topics in lesbian, bisexual and transgender health; and a basic science-clinical correlation in reproductive endocrinology.

During their **Surgery** training, students learn a broad base of fundamental skills and clinical knowledge pertaining to general surgery and the surgical specialties. The Surgery experience includes a variety of venues, with rotations in the traditional surgical disciplines as well as the subspecialties. Clinical experiences are enriched by a core curriculum that includes lectures with case discussions, standardized patient cases, and practice in basic surgical techniques. In addition to seeing patients in the hospital, emergency rooms and clinics, students attend conferences and participate in small group discussions utilizing the case study method of teaching. In the UMass Simulation Center, special sessions are offered on fundamental technical skills such as intravenous access, management of the patient with small bowel obstruction, and relevant human factors issues (including surgical decision making, communicating empathy and caring, oral presentations, and time management). All students participate in the Trauma Evaluation and Management program sponsored by the American College of Surgeons, as well as a day-long session dedicated to surgical imaging. A web site provides links to multiple resources including interactive case-based exercises that enhance student learning.

Students undertaking their **Psychiatry** clinical experience develop the interviewing, reasoning and communications skills fundamental to psychiatric diagnosis and intervention. An integrative model emphasizes the biologic, psychodynamic, social and behavioral aspects of treatment. Students learn about diagnosis and treatment of common psychiatric disorders, and develop an appreciation for the unique factors that influence presentation, treatment response and prognosis. Students also learn about the role of the psychiatrist and other mental health disciplines in the care of persons with mental illness; how to work as part of a health care team; and when and how to refer patients for mental health services. All students are given opportunities to see patients in hospital-based and ambulatory settings. UMass Memorial has a state-of-the-art emergency mental health facility where students can observe evaluations of adults and children in crisis. The Psychiatry core curriculum includes case-based teaching sessions, videotapes, role play with standardized patients, and new audience response technology. All students are given the opportunity to observe electroconvulsive therapy. A one-week enrichment selective is available where students can rotate on a unique psychiatric inpatient service for developmentally disabled adults.

A longitudinal curriculum supplements the learning in these core disciplines and addresses topics that cross over care throughout the Core Clinical Experiences. The innovative **Interclerkship** program addresses important contemporary issues and areas of need in our curriculum as identified by faculty and curriculum committees. The diverse Interclerkship courses comprehensively address medical and societal dimensions of health care in a wide range of topics including: domestic violence, geriatrics, disabilities, end-of-life care, multiculturalism, medical error/patient safety, oral health, pain management, and health care policy and the practice of medicine. Each Interclerkship is planned by a team of faculty and multidisciplinary professionals to address educational objectives from basic and clinical sciences as well as psychosocial, legal, ethical and
societal perspectives. A broad range of educational formats is used to promote active learning and interdisciplinary teaching. A typical Interclerkship is taught by as many as 40 medical school and community faculty, and includes plenary sessions, classroom teaching, small group workshops, expert panels, films, and interactions with standardized and real patients. Each Interclerkship emphasizes specific advocacy issues and highlights local and national resources to enhance students’ abilities to advocate for their patients and communities. Students are required to attend all scheduled Interclerkships and receive a credit grade for each one on their transcripts.

Upon completion of the core clinical experiences, all students must pass the End of Core Clinical Experiences Assessment (ECCEA) which evaluates student performance in the essential clinical skills and competency areas covered in the core disciplines. The ECCEA is a comprehensive performance-based assessment consisting of multiple clinical cases using standardized patients as well as other methods such as computer-based and manikin-based case simulations, X-ray interpretation, and physical exam models.

**Senior Studies**

**Senior Studies** begins in the spring of the third academic year, following completion of the core clinical experiences. This curriculum balances required and elective time to support students' personal and professional development. The required elements currently include a Neurology rotation, the Subinternship, an Advanced Biomedical Sciences selective, and a Capstone experience. The remainder of curriculum time is allocated to 24 weeks of electives.

During **Neurology**, students gain a solid foundation in the neurological exam, the interpretation and significance of exam findings, and the major neurological disorders and syndromes. Educational experiences include inpatient as well as outpatient rotations and a core curriculum to supplement clinical experiences.

The required **Subinternship** is designed to allow students the experience of managing patient care on an acute care hospital service under direct supervision of residents and attending physicians or hospitalists. These required rotations are offered in approved specialties that currently include **Internal Medicine, Family Medicine, and Pediatrics**. Rotations have been standardized to ensure comparable experiences with different patient populations. The roles and responsibilities of subinterns mirror that of interns as closely as possible. Duties include patient admission; initial evaluation and subsequent coordination of care; daily ward rounds and discharge planning; communication with primary care providers, consultants, patients and family members; necessary procedures; and coordination of discharge. Subinterns attend team and resident educational meetings and participate in a case-based curriculum which focuses on higher level practice-based skills. Some of these rotations include membership on a team with residents and interns, while others pair students directly with hospitalist faculty.

Required curricular elements under development include **Advanced Biomedical Sciences** and **Capstone Scholarly Project** experiences. The goal of the advanced biomedical sciences experiences is to allow students to select from a number of courses that emphasize frontiers in biomedical sciences in a field of interest relevant to students' interest, preferences and career path. The Capstone experience is designed to train our students as future physicians, in the principles of scholarship, research methods and scientific inquiry, so that all students will have an opportunity for a mentored scholarly project on a topic of choice and under the guidance of a faculty member. The program asks students to identify their chosen topic from a broad range of options including basic, clinical or behavioral sciences, and apply principles of research and scholarship to examine, collect and analyze information and develop a formal presentation, worthy of peer-review. Students are mentored through this work, which builds on the four-year curriculum.

For the remainder of the **Senior Studies** year, students undertake a planned program of study consisting of 24 weeks of elective experiences. With the guidance of an assigned faculty advisor, students develop an individualized and balanced elective schedule that includes rotations appropriate to their field of interest; work in both basic science and clinical medicine, and experiences in preparation for internship. Fourth-year
elective opportunities are available in diverse areas of interest such as the medical and surgical subspecialties; community-based experiences at public health agencies and community health centers; rotations sponsored by other U.S. medical schools; experiences abroad through our International Health Medical Education Program; and research in the clinical or basic sciences. As many as 30 percent of fourth-year students elect to participate in the Senior Scholars Program, which offers up to three months of supervised research experience under the sponsorship of a research faculty mentor. Students who participate in the Senior Scholars program do not need to complete an additional capstone project.

The Senior Studies year culminates in a Transition to Internship which offers students a choice of targeted curricula in areas relevant to their chosen field, including practicing relevant procedures in the UMMS Simulation Center, response to on-call urgencies and emergencies, laboratory medicine reviews, transitions of care and sign-out, and advanced cardiac/trauma/pediatric life support.

Overview: Learner-centered Integrated Curriculum (LInC)

In partnership with our diverse faculty, students, alumni and educational leaders, the Medical School continues its comprehensive four-year curriculum redesign, with the new Foundations of Medicine 1 (FOM1) curriculum commencing with the entering class of 2010. Guided by the school's competency-based framework established in 2003, our LInC redesign process translates the six foundational competencies into an innovative state-of-the-art educational program. Additional features of LInC innovations include:

- Enhancement of engaged learning through limitation of scheduled curriculum hours and expansion of independent study, varied teaching methods, and development of online student preparatory exercises. The goal is to better utilize student-faculty interaction time, and to promote self-directed and life-long learning through increased student responsibility for active learning.
- Diversity of teaching methods including interactive large and small group settings, online exercises, podcasts, video archives of lectures, simulation, standardized patients, peer-to-peer teaching, and direct patient encounters.
- Utilization of state-of-the-art technology to appropriately support student learning with digital and electronic systems—in both large and small group settings—through a technology-enhanced anatomy laboratory facility, and an Integrated Teaching and Learning Center.
- Broadening of student assessment methods, including formative assessment (which provides feedback to students without contributing to grades), balanced with summative assessment (which contributes to student grades), as well as electronic USMLE-type exams; short answer questions; simulation and standardized patient tests; graded exercises; and participation in small-group sessions.
- Scheduled time for students to participate in pathway programs, community-based activities, interest groups, optional enrichment offerings, and research activities including clinical/translational research pathway, master’s in clinical science investigation, and MD/PhD programs in biomedical and clinical/population health sciences.

As an integral aspect of the LInC redesign effort, the School of Medicine has begun a four-year initiative to dramatically enhance the training of medical students, residents and practicing physicians in geriatrics. Funded through a grant award from the Donald W. Reynolds Foundation, this initiative provides extensive resources to support the implementation of a comprehensive geriatrics curriculum as a longitudinal theme across all four years of the school’s educational program.

To provide a state-of-the-art learning environment to support the curriculum redesign, UMMS is undergoing a major transformation of our educational facilities and resources, including: the new, state-of-the-art anatomy laboratory facility; creation of an Integrated Teaching and Learning Center featuring interactive, technology-based and multimedia capabilities for small group and conference-style teaching and learning (dry lab); provision of cutting-edge technology in teaching laboratories and lecture halls; expanded and enhanced facilities for experiential learning and simulation to support hands-on clinical training utilizing simulation technology and standardized patients; expanded on-site computer access for students and wireless connectivity throughout the UMMS campus; student-dedicated independent study spaces; and enhanced student life facilities.
Our faculty and technology experts have partnered to create a robust array of educational resources, including online curriculum and video and pod capture of course lectures; the web-based curriculum calendar, providing students and faculty with universal, up-to-date access to course schedules and educational events; technology-based classroom sessions that integrate online, interactive teaching into large group lectures; and computer-based independent learning modules that include high resolution image databases, interactive learning exercises, web-based clinical simulations and computer-based testing. The transformation of educational facilities are well underway and will culminate in the dedication of the Albert Sherman Center, a new research and education facility on the University campus slated for completion in 2012.

Course Schedule
A representative listing of LInC courses:

**Foundations of Medicine (FOM1) Year 1**
- Transition to Medical School
- Doctoring and Clinical Skills (includes Small Group Sessions, Longitudinal Preceptorship Program I, Physical Diagnosis I)
- Building Working Cells and Tissues
- Integrated Case Exercises
- Principles of Genetics
- Development, Structure and Function
- Principles of Pharmacology
- Cancer Concepts
- Host Defense and Blood
- Infections

**Foundations of Medicine (FOM2) Year 2**
- Doctoring and Clinical Skills (includes Small Group Sessions, Longitudinal Preceptorship Program II, Physical Diagnosis II)
- Organ Blocks (includes seven major organ systems: Cardiovascular, Renal, Respiratory, Digestive, Reproductive, Endocrine, Musculoskeletal)
- The Brain: Nervous Systems and Behavior
- Determinants of Health (includes Community Health Clerkship Immersion Experience)
- Patients
- Preparation for USMLE Step I

**Core Clinical Experiences (CCE) Year 3**
- Transition to Core Clinical Experiences
- Core Clinical Experiences: Internal Medicine, Pediatrics, Family Medicine; Obstetrics and Gynecology, Surgery, Psychiatry
- Interclerkships (current offerings): Domestic Violence; Medical Error and Patient Safety; End-of-Life Care; Multiculturalism; Geriatrics; Disabilities; Pain Management; Oral Health; Health Care Policy and the Practice of Medicine
- End of Core Clinical Experiences Assessment

**Senior Studies Year 4**
- Neurology rotation; Subinternship in Family Medicine, Internal Medicine, or Pediatrics
- Electives: a variety of electives sponsored by UMMS departments and the Office of Undergraduate Medical Education
- Advanced Biomedical Sciences experience (selective)
- Capstone Scholarly Project experience
**Academic Year**

**Important Highlights** *(Note: Some dates may change)*

**August**
Start of Fall Semester for FOM1 and FOM2 students
Transition to Medical School curriculum for FOM1 students

**September**
Convocation for all medical students
Interclerkships begin for Core Clinical Experiences students

**November**
Interclerkship for Core Clinical Experiences students

**December**
End of Fall Semester for FOM1 and FOM2 students

**January**
Start of Spring Semester for FOM1 and FOM2 students
Interclerkships continue for Core Clinical Experiences students

**February**
Career Day for Core Clinical Experiences students

**March**
Match Day for Senior Studies students
Introduction to Core Clinical Experiences for FOM2 students

**April**
White Coat Oath Ceremony for FOM2 students
Interclerkships for Core Clinical Experiences students

**May**
End of Spring Semester for FOM1 and FOM2 students
Certification for graduation for Senior Studies students
Transition to Internship for Senior Studies students
Preparation for USMLE Step I for FOM2 students
End of Core Clinical Experiences Assessment
Transition to Core Clinical Experiences curriculum

**June**
Commencement for Senior Studies students
Interclerkship for Core Clinical Experiences students
End of Core Clinical Experiences