



**VIRGINIA TECH CARILION  
SCHOOL OF MEDICINE  
COURSE CATALOG  
2015-2016**

## YEAR ONE

### **MED 600. Orientation to Medical School and to VTCSOM (1 credit)**

Topics for this course include:

Patient Centered Learning Case process, Introduction to the Curriculum and Value Domains, VTCSOM Student Policies and Procedures, Introduction to Student Services, Introduction to Student Health and Well-Being.

*Prerequisite(s): None*

*Co-requisite(s): None*

### **MED 601. Block I: Functional Biology of Cells and Tissues, Patient Centered Interviewing and Physical Exam I, Fundamentals and Foundations of Research, Interprofessional Teamwork and Roles for Collaborative Practice (11 credits)**

Topics for this course include:

**Functional Biology of Cells and Tissues:** Molecules, Genes, Chromosomes, Proteins, Cells, Tissues, Metabolism, Transcription, Translation, Musculoskeletal System, Early Development, Pharmacodynamics, and Pharmacokinetics

**Interviewing and Physical Exam I:** Patient Centered Interviewing, Introduction to the Physical Exam (Musculoskeletal Exam including Ultrasound)

**Fundamentals and Foundations of Research:** The Scientific Method, Thinking like a Scientist Physician, Basic, Clinical, and Translational Research Principles, The Protection of Human Subjects in Research, the Use and Protection of Animals in Research, Research Live, and the Medical Scholar Series

**Interprofessional Teamwork and Roles for Collaborative Practice:** Healthcare Roles and Responsibilities, Introduction to Team Building, Interprofessional Collaboration, Interprofessional Teams from an Individual Perspective, Team Dysfunction, Challenges and Issues in Team Dynamics (Conflict Resolution, Accountability, Feedback, etc), Healthcare Roles and Scopes of Practice

*Prerequisite(s): MED 600*

*Co-requisite(s): None*

### **MED 602. Block II: Human Body I, Interviewing and Physical Exam II, Research, Interpersonal and Interprofessional Communication (11 credits)**

Topics for this course include:

**Human Body I:** Immunology, Cardiovascular, Respiratory, and the Autonomic Nervous System

**Interviewing and Physical Exam II:** Patient and Doctor- Centered Interviewing (History of Present Medical Illness, Past, Medical, Family, Medications & Habits), Vital Signs, Heart and Lungs, BMI, Vascular Ultrasound, Longitudinal Ambulatory Care Experience (LACE)

**Research:** Biostatistics, Research Live and the Medical Scholar Series

**Interpersonal and Interprofessional Communication:** Learning Team Debrief Method, Quality of Healthcare and Patient Safety, Team Review of Quality Project, Begin Planning for Service Learning Project

*Prerequisite(s): MED 600 -601*

*Co-requisite(s): None*

**Med 603. Block III: Human Body II, Interviewing and Physical Exam III, Research, Collaborative Leadership in the Healthcare Environment (11 credits)**

Topics for this course include:

**Human Body II:** GI Tract, Liver and Biliary, Renal, Endocrine, and Reproduction

**Interviewing and Physical Exam III:** Patient and Doctor-Centered Interviewing (Personal & Social Hx), Abdominal Exam, Male and Female Genitourinary Exams, Breast Exam, Cultural Considerations, Abdominal Ultrasound, LACE

**Research:** Epidemiology, Research Live, Medical Scholar Series, Research Mentor and Project Selection

**Collaborative Leadership in the Healthcare Environment:** Application of Leadership Practices that Support Collaborative Team Effectiveness through two-phased team Simulation Experience, Planning Community Service Learning Project

*Prerequisite(s): MED 600 – 602*

*Co-requisite(s): None*

**Med 604. Block IV: Biology of the Nervous System, Interviewing and Physical Exam IV, Research Outcomes, Community Service learning Project (11 credits)**

Topics for this course include:

**Biology of the Nervous System:** Central Nervous System, Peripheral Nervous System, Special Sensory Structures

**Interviewing and Physical Exam IV:** Patient and Doctor- Centered Interviewing (Review of Systems), Neurological Exam, Pediatric Development, HEENT, Dental Exam, Mental Status Exam, Normal Aging Process, LACE

**Research Outcomes:** Research Prospectus preparation and presentation, Medical Scholars Series

**Collaborative Leadership in the Healthcare Environment (continued):** Application of Leadership Practices that Support Collaborative Team Effectiveness through two-phased team Simulation Experience, Community Service Learning Project

*Prerequisite(s): MED 600 - 603*

*Co-requisite(s): None*

**MED M1 Research: Research (3 credits)**

Students will complete three weeks of independent research.

*Prerequisite(s): MED 600 - 604*

*Co-requisite(s): None*

## YEAR TWO

### **MED 701. Block V: Fundamentals of Pathobiology, Interviewing and Physical Exam V, Research, Experience and Assessment of Interprofessional Health Care Teams (8 credits)**

Topics for this course include:

**Fundamentals of Pathobiology:** Cells and Tissues, Necrosis, Neoplasia, Inflammation, Genetic Disorders, Immunological Diseases, Infection, Microbiology, Virology, Skin Disorders, Pharmacology, Therapeutics

**Interviewing and Physical Exam V:** Clinical Skills Review (Complete Hx & Physical Exam), Detailed Family & Genetic Hx, Dermatology Exam, Ultrasound, Fundamentals of Case Presentation I, Clerkship Competency Series: Gown & Glove, Health Promotion & Disease Prevention, Adult Immunizations, LACE

**Research:** Individual Student Research Project

**Experience and Assessment of Interprofessional Health Care Teams:** On-site evaluation of Interprofessional Healthcare teams, High-Fidelity Simulation Scenarios

*Prerequisite(s): MED 600 – 604 and MED M1Research*

*Co-requisite(s): None*

### **MED 702. Block VI: Pathobiology of the Human Body I, Interviewing and Physical Exam VI, Research, Ethical and Legal Issues in Healthcare I (8 credits)**

Topics for this course include:

**Pathobiology of the Human Body I:** Hematology, Bleeding disorders, White Cell Disorders, Vascular Diseases, Heart, Pulmonary, ENT, Lymph Nodes and Spleen, Microbiology, Virology, Pharmacology, Therapeutic

**Interviewing and Physical Exam VI:** Assessing Stages of Change: Smoking Cessation, Exam Findings in Cardiopulmonary Disease, ECG and Chest x-ray Interpretation, Clerkship Competency Series: ABG's, Venous Blood Draws, Oxygen Therapy, LACE

**Research:** Individual Student Research Project

**Ethical and Legal Issues in Healthcare:** Truth Telling and Confidentiality, Paternalism and Patient Autonomy, Informed Consent, Pre-natal Life, Assisted Dying, Scarce Resources, Integrity

*Prerequisite(s): MED 701*

*Co-requisite(s): None*

### **MED 703. Block VII: Pathobiology of the Human Body II, Interviewing and Physical Exam VII, Research, Medicine, Culture and Society (8 credits)**

Topics for this course include:

**Pathobiology of the Human Body II:** GI Tract, Liver, Pancreas, Renal, Male and Female GU, Breast, Microbiology, Virology, Pharmacology, Therapeutics

**Interviewing and Physical Exam VII:** Fundamentals of Case Presentation II, Interview Skills: Nutrition & Supplement History, OB & Sexual History, Review: Breast, GU exams, Exam findings in GI and Renal, H & P and Psychosocial Aspects of GI, Renal, and Urogenital Diseases including ultrasound findings, Abnormal Breast Exam, Clerkship Competency Series: NG tube, Foley catheter, LACE

**Research:** Individual Student Research Project

**Medicine, Culture and Society:** Cultural and Social Norm Effects, Ethical and Cultural Implications of Rapidly Changing Technology, Development of Reflective Competencies Introduction to Medical Humanities and Narrative Medicine

*Prerequisite(s): MED 701-702*

*Co-requisite(s): None*

**MED 704. Block VIII: Pathobiology of the Human Body III, Interviewing and Physical Exam VIII, Research, Current Topics in Interprofessionalism (8 credits)**

Topics for this course include:

**Pathobiology of the Human Body III:** Oral Medicine, Endocrine, Skeletal and Soft Tissues, Musculoskeletal Environmental and Nutritional Diseases, Central and Peripheral Nervous Systems

**Interviewing and Physical Exam VIII:** H & P and Psychosocial Aspects of Neuromuscular Diseases, Clinical psychiatric syndromes and their underlying neurobiologic dysfunctions, Exam findings in HEENT and Dental Diseases, Endocrine Cases including Thyroid Ultrasound, Review Pediatric Development, Clerkship Competency Series: Suturing & Wound Care, LACE

**Research:** Individual Student Research Project

**Current Topics in Interprofessionalism:** Public Health, Risk Reduction, Complimentary and Integrative Medicine, Quality and Safety (IHI) Modules

*Prerequisite(s): MED 701-703*

*Co-requisite(s): None*

**MED M2 Independent Study: Independent Study (8 credits)**

Students will complete 6 weeks of Step 1 preparation.

*Prerequisite(s): MED 701 - 704*

*Co-requisite(s): None*

**MED M2 Research: Research (11 credits)**

Students will complete 8 weeks of independent research.

*Prerequisite(s): MED 701 - 704*

*Co-requisite(s): None*

## YEAR THREE

The Virginia Tech Carilion School of Medicine requires clerkship rotations in the following medical specialties and in Research in the M3 year:

- Internal Medicine (6 weeks)
- Family Medicine (6 weeks)
- Pediatrics (6 weeks)
- Obstetrics and Gynecology (6 weeks)
- Psychiatry (6 weeks)
- Surgery (6 weeks)
- Emergency Medicine (4 weeks) - occurs in the M3 or M4 year and has a prerequisite of having completed the Internal Medicine, Surgery, OB-GYN, and Pediatric Clerkships.
- Radiology (2 weeks)
- Neurology (2 weeks)
- Research (4 weeks)

### **MED 801. Clerkship – Emergency Medicine (4 credits):**

This clerkship will occur in the last portion of the 3<sup>rd</sup> year or the first half of the 4<sup>th</sup> year. Students will spend the four week clerkship in the Carilion Roanoke Memorial Hospital Emergency Department working various shifts and learning to rapidly assess a patient stability and initiate urgent work-ups and treatments.

*Prerequisite(s): MED 705, MED 803, MED 805, MED 806, MED 809 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 4 weeks*

### **MED 802. Clerkship – Family Medicine (6 credits):**

The student will work with one of the Roanoke-based Family Medicine practices. During this six week clerkship, the student will have a wide variety of experiences and be exposed to a myriad of different patients, but should come away with firm knowledge of how to approach all of the different situations from the comprehensive, patient-centered view that characterizes Family Medicine. The required Geriatric Medicine experience for the 3<sup>rd</sup> year will occur during the Family Medicine clerkship.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 6 weeks*

### **MED 803. Clerkship – Internal Medicine (6 credits):**

The 3<sup>rd</sup> year clerkship in Internal Medicine will occur at Carilion Roanoke Memorial Hospital. It will span six weeks. The focus will be on caring for adult hospitalized patients. The six weeks will be spent working with one of the Internal Medicine teaching teams.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 6 weeks*

**MED 804. Clerkship – Neurology (2 credits):**

The 3<sup>rd</sup> year clerkship in Neurology is a two week experience that will be divided between working with the Carilion Clinic Neurologists in the inpatient and outpatient settings and the Neurologists at the Salem VA Medical Center. Students will be exposed to a variety of cases and be able to observe the means by which Neurologists diagnose and treat diseases of the central and peripheral nervous systems, and of skeletal muscle.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 805. Clerkship – OB-GYN (6 credits):**

The focus of this six-week rotation is to expose students to both obstetrical and gynecologic patients with a broad range of issues. During the six week clerkship, students will spend one week on each of the following: labor and delivery days, labor and delivery nights, and the ob clinic. Students will additionally spend two weeks on the gynecologic service which will include inpatient gynecology, outpatient gynecology and time in the operating room. Finally, students will spend one week on one of the gynecologic subspecialty services.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 6 weeks*

**MED 806. Clerkship – Pediatrics (6 credits):**

The six-week Pediatric Clerkship will be divided into two weeks of inpatient pediatrics at Roanoke Memorial Hospital (RMH), one week of newborn nursery at RMH, two weeks of outpatient general pediatrics, and one week of pediatric subspecialties. Through these clinical experiences, the student will get an extensive overview of general pediatrics.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 6 weeks*

**MED 807. Clerkship – Psychiatry (6 credits):**

The six-week psychiatry clerkship is designed to continue with the principles of lifelong learning, humanism, inquiry, and professionalism established in the preclinical years. The clerkship is divided into two sections. All students participate in the same initial core four week rotations, based on the Adult Inpatient Psychiatry units at Carilion Medical Center. Each patient will be followed by a given student from admission to discharge. During the final two weeks of the clerkship this student will opt for two separate "selective" rotations of one week each.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 6 weeks*

**MED 808. Clerkship – Radiology (2 credits):**

The 3<sup>rd</sup> year clerkship in Radiology is a two-week experience where the student will become familiar with the commonly used imaging modalities and imaging findings of medical, surgical, and traumatic conditions. Students will also become familiarized with the concepts and principles of appropriateness criteria, their incorporation in, and evolution from evidence based medicine. This will be achieved through a variety of experiences in the radiology department.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 809. Clerkship – Surgery (6 credits):**

The focus of this six week rotation is to introduce students to the care of surgical patients including initial patient assessment and perioperative management as well as surgical intervention itself. Students will spend four weeks with a general surgery service and two weeks with a subspecialty service. This rotation length will allow good continuity with the surgical team and the patients under the care of the various surgery teams.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 6 weeks*

**MED M3 Research: Research (4 credits)**

Students will complete four weeks of independent research.

*Prerequisite(s): MED 705 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 4 weeks*

**Electives:** For students not doing the Emergency Medicine Clerkship during the 3<sup>rd</sup> year, there are four weeks of elective time available. These four weeks can be divided into 2 two-week electives or 1 four-week elective. Each two-week experience counts as 2 credits and each four-week experience counts as 4 credits.

**MED 900. Elective - Step 1 Preparation Independent Study (2, 4, or 6 credits):**

The focus of this elective is to provide structured study time and educational resources for students who have been required to delay their Step 1 examination due to not achieving a target practice test score or for students who have taken and failed the Step 1 examination. Students will create a structured study plan and will work with the Senior Dean for Academic Affairs (or designee) in collaboration with the Associate Dean for Student Affairs and appropriate faculty to implement this independent study plan. Students may be enrolled in this course for an additional independent study if approved by the Associate Dean for Student Affairs.

*Prerequisite(s): Year 1*

*Co-prerequisite(s): None*

*Duration: 2, 4, or 6 weeks*

900-2 (2 week Independent Study Elective)

900-4 (4 week Independent Study Elective)

900-6 (6 week Independent Study Elective)



## YEAR FOUR

Required curricular components (10- 14 weeks depending on whether Emergency Medicine was completed in Year 3):

- Emergency Medicine Clerkship – 4 weeks
- Research – 2 weeks
- Site Specific Elective – 2 weeks
- Medical Subspecialty Elective – 2 weeks
- Surgical Subspecialty Elective – 2 weeks
- ICU Elective – 2 weeks
- Dean’s Colloquium- 2 weeks

Electives (18 or 22 weeks depending on whether Emergency Medicine was completed in Year 3)

Vacation - 10 weeks from which other electives can be added.

### **MED 801. Clerkship – Emergency Medicine (4 credits):**

This clerkship will occur in the last portion of the 3<sup>rd</sup> year or the first half of the 4<sup>th</sup> year. Students will spend the four week clerkship in the Carilion Roanoke Memorial Hospital Emergency Department working various shifts and learning to rapidly assess a patient stability and initiate urgent work-ups and treatments.

*Prerequisite(s): MED 705, MED 803, MED 805, MED 806, MED 809 and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 4 weeks*

### **MED M4 Research: Research (2 credits)**

Students will complete two weeks of independent research.

*Prerequisite(s): Years 1, 2, 3, and the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 2 weeks*

### **MED COL. Dean’s Colloquium (2 credits)**

This course occurs during the final two weeks in the four year curriculum. Students are provided information on current updates in basic sciences, debt repayment and financial aid issues, residency preparation suggestions, legal issues and new educational developments at VTCSOM. Students may present their research projects during this week.

*Prerequisite(s): Years 1, 2, 3.*

*Co-requisite(s): None*

*Duration: 2 weeks*

## **ELECTIVES**

**Basic Science**

**Emergency Medicine**

**Family Medicine**

**Internal Medicine**

**Interprofessionalism**

**International**

**Medical Education**

**Neurology**

**Obstetrics and Gynecology**

**Orthopaedics**

**Pediatrics**

**Psychiatry**

**Radiology**

**Surgery**

**Away Elective**

**Independent Study**

**Research**

\*At the discretion of the Elective Director, prerequisites for an elective may be waived.

## Basic Science

### **MED 900 BS-A. Elective - Anatomy Prosection (2 credits):**

The goal of this elective is to increase the knowledge of students in prosection in specific anatomical areas. Objectives are to identify and prosect an area of anatomic interest, identify one pathological condition associated with the area dissected and describe findings, describe clinical significance of dissected area during course of a clinical procedure, describe age-related variations in the dissected area, describe how an age-related difference would affect clinical care, and identify normal variations, if any.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 900 BS-B. Elective - Current Topics in Gene Therapy (2 credits):**

Each iteration of the course will focus on gene therapy for a particular condition. Students will read, evaluate and present scientific papers in the primary literature. The course will be conducted in a seminar format with extensive student participation.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 900 BS-D. Elective - Forensic Pathology (4 credits):**

Medical students will be exposed to daily procedures of Forensic Pathology with the expectation that students will learn to determine cause of death, based on circumstances surrounding death, past medical history, and pathological diagnoses determined in the course of autopsy examination. Students will learn to properly complete a death certificate and how to testify in court as an expert witness. Also, students will learn about the impact of cases on public health and safety.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 4 weeks

### **MED 903R. Elective - Pathology (2 credits):**

The Elective will consist of reviewing gross and microscopic pathology specimens with attending pathologists, attending and participating in multidisciplinary conferences, observing the operation of the clinical and histologic laboratories, participating in autopsy pathology, and correlate pathologic diagnoses with patient management using principles of evidence-based medicine. The Medical Student will review the patient's clinical history, physical exam, laboratory data, and radiologic studies and correlate the relevant information with gross and microscopic findings of patient specimens. From this information the medical student will develop a differential diagnosis, plan the diagnostic evaluation and relate the final pathologic diagnosis to patient outcome, based on sound anatomic pathology and laboratory medicine principles.

*Prerequisite(s):* Years 1, 2 + MED 803, MED 805, MED 806, or MED 809

*Co-requisite(s):* None

*Duration:* 2 weeks

## Emergency Medicine

### **MED 901A. Elective - Clinical Decision-Making (2 credits):**

How do we make decisions? What thought processes occur when a physician assimilates multiple pieces of information to arrive at a plan of action, a diagnosis, or a treatment modality? What are sources of error in our thought processes, and how can we learn to overcome them to be more effective decision makers? This 4-week elective will consist of several readings, discussions, and direct observation of physician decision-making in the Emergency Department setting. Clinical preceptors will include Damon Kuehl, MD and Corey Heitz, MD. The elective will take place at CRMH.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 901B. Elective - Emergency Ultrasound (2 credits):**

This 2-week Elective will consist of learning to perform basic limited point of care ultrasound examinations on patients who are in the emergency department at Carilion Roanoke Memorial Hospital. The Medical Student will perform bedside ultrasounds under supervision and create a portfolio of studies and interesting cases that were performed. From these studies, the medical student will develop an understanding of ultrasound physics, learn standard ED scan protocols, and learn to interpret positive and negative findings in real time. Clinical preceptors include Michelle Clinton, MD. This elective will take place at CRMH.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 901C. Elective - Pre-Hospital Medicine (2 credits):**

The Elective will consist of didactics and observational ride-along shifts with EMS units in the Roanoke area. The Medical Student will receive education in the principles of prehospital medicine, including capabilities, limitations, skill levels, and costs associated with prehospital transportation methods. Over the course of 2 weeks, the student will receive several hours of didactic education as well as participate in 6-8 shifts with EMS and fire units in the city. Clinical preceptors will be members of the Roanoke City EMS and Corey Heitz, MD. The elective will take place at CRMH and with Roanoke City EMS.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 901D. Elective - Pediatric Emergency Medicine (4 credits):**

The 4-week Elective will consist of shifts in the Pediatric Emergency Department at Carilion Roanoke Memorial Hospital. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and design the acute management of the patient. The Medical Student will then observe and/or participate in the medical care and procedures that make up the patient's management plan. Emphasis will be placed on age-appropriate exam techniques and treatment modalities for acutely ill and injured children. This elective is meant to be an intensive clinical experience in Pediatric Emergency Medicine. The

clinical preceptors will be Melanie Prusakowski, MD and Lisa Uherick, MD along with other members of the CRMH ED faculty.

*Prerequisite(s): Years 1, 2, MED 803, MED 805, MED 806 + MED 809*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 901E. Elective - Acting Internship in Emergency Medicine (4 credits):**

The 4-week Acting Internship (AI) in Emergency Medicine is meant to complement an EM clerkship. While it is not required, it is recommended that students have had a prior clerkship experience to gain the baseline fund of knowledge. The AI is meant to serve as a month long “interview” rotation, and therefore students are expected to have an interest in pursuing a career in Emergency Medicine with Carilion Roanoke Memorial Hospital as a possible residency destination. Students will work a schedule similar to that of an intern in our Emergency Medicine residency in the ED at CRMH. Students will be responsible for initial patient assessment, presentation to attending physicians, as well as developing independent management plans. Focus will be on multi-tasking skills and development of plans of care appropriate for the student’s educational level. Opportunities will exist for students to gain extra exposure to an area of interest (ultrasound, prehospital, tactical, wilderness medicine, academic/educational development) and students are encouraged to contact us ahead of time to allow time to arrange these experiences. Clinical preceptors include Corey Heitz MD, Damon Kuehl MD, and other members of the CRMH ED faculty.

*Prerequisite(s): Years 1, 2 + MED 801*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 901F. Elective - Wilderness Medicine (2 or 4 credits)**

This elective will be an immersive experience in Wilderness Medicine. This elective will be a two-week elective offered twice a year, once in the Fall and once in the Spring. Each two week elective will be limited to 8 students. Over the course of the two weeks the students will develop the skills and knowledge necessary to practice medicine in an austere environment. They will also learn the skills necessary to survive in such environments and the means by which they can bring patients to definitive care. Their experience will include small group learning, hands-on work stations, and immersive trips to the outdoors. Clinical preceptors are Drs. Tim Fortuna and Stephanie Lareau and locations for experiences will include Carilion Roanoke Memorial Hospital, Mill Mountain Zoo, and others TBD.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 901G. Elective – Acute Care Skills Certificate (2 credits)**

This elective consists of a 2 week, intensive set of training to prepare graduating medical students for their residencies. Over the course of two weeks, students will obtain certification in Advanced Trauma Life Saving (ATLS), Pediatric Advanced Life Saving (PALS), and Critical Care skills (Fundamental Critical Care Support, FCCS). If time and interest allow, students will also obtain Basic Disaster Life Support training and certification (BDLS).

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): none*

*Duration: 2 weeks*

**MED 901H. Elective – Introduction to Emergency Medicine (2 credits)**

The Emergency Department is a unique environment in the hospital. Unselected patients with undifferentiated chief complaints arrive to the ED with no appointments. ED physicians need to rapidly triage, stabilize, rule in and rule out diagnoses, and determine appropriate destination for further workup or definitive treatment. This elective is designed for the student who is interested in Emergency Medicine as a career and needs earlier exposure to EM. (Example- Student has changed career choice and did not complete EM clerkship in M3 year). Acceptance to the elective is based on application directly to the Emergency Medicine Clerkship Director.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): none*

*Duration: 2 weeks*

**MED 901I. Elective – Evidence Based Medicine (2 credits)**

Why did we order that test? What is the evidence for ordering a CBC on a patient with belly pain? Why would you reflexively order a CT scan on a patient older than 65 with new onset abdominal pain? These questions and many others will be answered as you search for the primary literature for support of medical decisions made in the Emergency Department. This 2-week elective will consist of several readings, discussions, and direct observation of physician decision-making in the Emergency Department setting.

*Prerequisite(s): Years 1, 2*

*Co-requisite(s): none*

*Duration: 2 weeks*

**MED 901J. Elective – Rural Emergency Medicine (2 credits)**

To introduce Medical Students to a both a more rural population of individuals with a wide variety of emergency department presentations, as well as to become familiar with a different hospital system in this more rural setting. It will be expected that the Medical Students will further develop their skills of history taking, physical examination, critical thinking and knowledge of emergency room medicine, including pharmacology, while becoming competent and confident in the diagnosis and management of these issues. This elective is to assist the student in understanding the type of care that can be offered in a rural setting. More specifically, the student will see the contrast in the rural and urban setting in managing patients in terms of onsite specialists, onsite medical equipment, and onsite ancillary services. The student will learn that these limited resources may determine the need to transfer the patient to a higher level of care in an urban medical center where their core Emergency Medicine clerkship has been completed.

*Prerequisite(s): Years 1, 2+ MED 801*

*Co-requisite(s): none*

*Duration: 2 weeks*

## Family Medicine

### **MED 902A. Elective - Inpatient Geriatric Medicine (2 or 4 credits):**

The Elective will consist of consulting on patients in CRMH. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and design the geriatric management of the patient, based on sound geriatric principles. The preceptor is Dr Gaddam and the rotation is at Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 802*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 902B. Elective - Nursing Home Medicine (2 or 4 credits):**

The Elective will consist of following patients in a local nursing home. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and design the geriatric management of the patient, based on sound geriatric principles. This is a site specific elective. The preceptor is Dr D'Amora and the location is a local nursing home.

*Prerequisite(s): Years 1, 2 + MED 802*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 902C. Elective - Public Health (4 credits)-New River Valley**

The student will be given an overview of all of the above areas and will obtain knowledge of each sufficient to be able to access and refer to the various areas as appropriate. This will give the student a strong base of knowledge of all the services provided by the Health Department. The student will also be able to tailor the experience to explore more fully one or more of the above areas. This is a site specific elective. The preceptor is Dr. Molly O'Dell and the location is the New River Valley Health Department.

*Prerequisite(s): Years 1, 2*

*Co-requisite(s): None*

*Duration: 4 weeks*

### **MED 902D. Elective - Rural Family Medicine (4 credits):**

The overall goal of this course is to immerse students in primary care as practiced in a setting distant from immediate access to a tertiary care center. The focus is on the following themes:

- Development of autonomy dealing with common and serious conditions in rural primary care.
- Exploration of roles played by physicians in the community.
- Service learning particularly as applied to rural underserved care.
- Understanding referral and consultation relationships in a rural environment.
- This is a site specific elective.
- The preceptors are Dr. Beth Polk and the location is two outpatient practices.

*Prerequisite(s): Years 1, 2 + MED 802*

*Co-requisite(s): None*

**MED 902H. Elective - Functional Medicine (2 credits):**

The Elective will consist of 2 weeks of consulting on patients in different clinical, exercise, and consultative settings throughout Roanoke and Rocky Mount, Virginia. While learning evidence-based practices of helping individuals and families adopt and sustain healthy behaviors that affect health and quality of life, the Medical Student will also be challenged to create a personal 2-week plan for lifestyle modification based upon results of an initial panel of lifestyle questionnaires and an initial evaluation of physical and nutritional fitness. This 2-week Elective will not be offered in the last two weeks of May, the last two weeks of August, the last two weeks of November, or the last two weeks of December. The preceptor is Dr Michael Arthur and the location is at several outpatient sites.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 902F. Elective - Student Health (2 or 4 credits):**

The overall goal of this course is to expose students to primary care as practiced in a student health setting. The focus is on the following themes:

- Development of autonomy dealing with common and serious conditions in a student health setting.
- Exploration of roles played by physicians in the community.
- Understanding the unique challenges and issues associated with caring for a student population.
- This is a site specific elective.
- The preceptor is Dr. Thomas Knisely and the location is at Radford University and is available Sept-mid December and mid January to early May.

*Prerequisite(s):* Years 1, 2 + MED 802

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 902G. Elective - Acting Internship in Family Medicine (4 credits):**

The Acting Internship in Family Medicine is designed to engage fourth-year medical students in learning a high level of responsibility for primary, inpatient care from a unique Family Medicine approach and understand the family physicians' role in the hospital setting. Other opportunities for student learning may include: assisting with or performing, under supervision, simple procedures; participating in the evaluation of patients in the emergency room under the supervision of an upper level resident; working in the antepartum service, labor & delivery, the obstetrical wards, as these areas relate to family medicine training. The preceptor is the Family Medicine inpatient attending and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 4 weeks



## Internal Medicine

### **MED 903A. Elective - Clinical Infectious Diseases (4 credits):**

The Elective will consist of consulting on patients with infections who are hospitalized at Carilion Roanoke Memorial Hospital. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and design the infectious disease management of the patient, based on sound microbiological, antibiotic and physiological principles. The preceptor is the attending on the inpatient service and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2 + MED 803

*Co-requisite(s):* None

*Duration:* 4 weeks

### **MED 903B. Elective – Cardiology Consults (2 or 4 credits):**

The Cardiology Consult Elective will give the Medical Student an introduction in rendering consultative advice on a wide variety of cardiovascular issues in a hospital setting. Typical patients will include pre-operative clearance for non-cardiac surgeries, post-operative complications including arrhythmias and hemodynamic instability, or patients with acute coronary syndromes, heart failure or other cardiovascular issues admitted to non-cardiology services. The Medical Student will perform complete reviews of patients electronic medical records, take an independent history, and perform a complete physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic studies including laboratory tests and imaging studies and design the cardiovascular management plan for the patient. The Medical student will be part of the rounding team that will include the attending, cardiology fellow, and often one or more medical residents. The medical student will review his/her management plan with the fellow and/or resident before presenting it to the attending. The preceptor is the attending on the inpatient service and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2 + MED 803

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

### **MED 903C. Elective - Rheumatology (2 or 4 credits):**

The Elective will consist of consulting on patients with a focus on outpatient care. While there may be an occasional inpatient consultation the majority of experience will be in the evaluation and treatment of musculoskeletal problems and rheumatologic diseases in the outpatient setting. The Medical Student will evaluate the patient with chart review, complete history, and physical examination and documentation in EPIC. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and be able to outline treatments for the common mechanical and degenerative and inflammatory musculoskeletal problems and rheumatologic diseases. The preceptor is Dr. Bankole and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 903D. Elective - Physical Medicine and Rehabilitation (2 or 4 credits):**

Students will learn how to assist individuals who have permanent impairments (paralysis, sensory loss, cognitive dysfunction, alteration of consciousness, decreased endurance, etc.) in identifying their remaining abilities and developing them to their maximum potential. There is a strong emphasis on the team approach, with communication as the vital link between team members, most importantly the patient and the patient's family. We will try to focus on issues that the students will be likely to see in their primary practices. This is a site specific elective. The preceptor is Dr. Lennox McNeary-Keyes and the location is the rehab unit at Carilion Roanoke Community Hospital.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 903E. Elective - Electrocardiography (2 credits):**

Electrocardiography is widely used as a method for aiding the evaluation of heart health or disease in all patient populations, often as an important laboratory test included along with history and physical findings. Part of evaluating patients who are healthy or who may have cardiac disease rests upon the accurate interpretation of ECGs. The medical student ECG elective will introduce the student to the basic technical aspects of electrocardiography and reading or interpretation of the electrocardiogram (ECG). The material to be covered in this elective will increase the student's ability to recognize important findings in the normal ECG, and in the ECG which is abnormal due to chronic or acute cardiac conditions. This elective is offered only during the "c" and "e" slots of each block. The preceptor is Dr. Dickerson and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 903F. Elective - Pulmonary Medicine (2 or 4 credits):**

The course consists of consulting on patients with Pulmonary Diseases who are hospitalized at Carilion Roanoke Memorial Hospital, and evaluating patients with Pulmonary Diseases in the outpatient Clinic. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information and the integration of physiopathological principles, the Medical Student will develop a differential diagnosis, learn how to prioritize this, and propose a treatment plan. The preceptor is the inpatient attending and the location is the outpatient office and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2 + MED 803

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 903G. Elective - Ambulatory Internal Medicine (2 or 4 credits):**

Students will be paired with a Faculty member in Internal Medicine and see patients at Carilion Clinic Internal Medicine-Riverside. Students will be exposed to a wide array of patients with diseases and conditions typically seen in an outpatient Internal Medicine setting, such as, diabetes, hypertension, and chronic lung disease. Students will learn to do a focused history and physical exam pertinent to the patient's reason for being seen. Students will then report their findings to the attending physician and together formulate a management plan for the patient. The preceptor is the ambulatory faculty attending and the location is the outpatient clinic.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903H. Elective - Palliative Medicine (2 or 4 credits):**

The Elective will consist of consulting on patients with serious illnesses who are hospitalized at Carilion Roanoke Memorial Hospital. The medical student will do the patient's chart review, history taking, and physical examination. From this information the medical student will be able to synthesize information to develop an interdisciplinary plan of care incorporating palliative care principles for the patient and family that addresses comprehensive views of suffering. The preceptor is Dr. Steven Griswold and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 803*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903I. Elective - Acting Internship in Internal Medicine (4 credits):**

The Internal Medicine Acting Internship (AI) rotation seeks to provide the Senior Medical Student an inpatient learning experience similar to that of a PGY1 Internal Medicine Resident. The student will be assigned to an inpatient Faculty Internal Medicine teaching team comprised of an attending physician, a PGY2 or 3 resident, 2 PGY1 residents, and possibly 1 or 2 other medical students. The student will be assigned patients admitted to their team and will assume an integral role in providing care for that patient during their hospitalization. The student on the AI rotation will be assigned duties and responsibilities very similar to those of the PGY1 residents. These duties include but are not limited to taking a complete history and performing a complete physical on the patients assigned to them, initiating appropriate orders on their patients, which will require co-signature, following the patient throughout their hospitalization, and assisting with discharge planning. The AI student may also be involved in procedures on their patients when indicated. The student will be expected to be on call when their team is on call, including overnight call similar to other PGY1 residents (presently 1 in 8) as well as follow all duty hour rules of the program. The student will also be expected to participate in teaching activities including contributions to teaching rounds and morning report. The student will be expected to attend the didactic conferences provided to the students and residents. The preceptor is the inpatient attending and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 903J. Elective - Acting Internship in Cardiology (4 credits):**

The 4<sup>th</sup> year medical student who takes this elective will be immersed in a busy inpatient cardiology service with exposure to a wide spectrum of cardiovascular diseases including acute coronary syndromes, valvular heart diseases, cardiomyopathies and common dysrhythmias. S/he will also help manage an outpatient cardiology observation unit. Most patients in observation unit will be low-risk patients with chest pain or those with heart failure exacerbations. Chest pain patients will be ruled out for myocardial necrosis, then undergo appropriate non-invasive studies such as exercise treadmill testing, exercise or dobutamine stress echocardiography, nuclear cardiology study (e.g. Lexiscan), or cardiac computed tomographic angiography study. The Acting Intern (AI) will be involved in deciding the most appropriate noninvasive/imaging modality for the patient as well as participate in analyzing the ECG and imaging aspects of the study. Patients with heart failure will be investigated for etiology

of HF exacerbation, have appropriate diagnostic studies and adjustment of medical regimens. Some of the patients from the observation unit will be admitted to the AI's inpatient service. The AI will work closely with the attending, a mid level provider and with an intern. On most rotations, a cardiology fellow will also be involved in teaching the AI and intern. The preceptor is the inpatient attending and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 903K. Elective - CCU (2 or 4 credits):**

The CCU provides intensive care for a wide range of cardiovascular issues. The student will be exposed to unstable acute coronary syndromes, cardiogenic shock, decompensated heart failure, unstable rhythms, hypothermia protocol, and many other unstable cardiac conditions requiring intensive care. The rotation occurs in the Coronary Care Unit of Roanoke Memorial Hospital and the student will work with the CCU team to provide care for the patients in the unit. The student will participate in cardiac catheterizations and other procedures as warranted. The rotation includes weekend, evening, and overnight duties. The preceptor is the CCU faculty attending.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903L. Elective - Dermatology (2 or 4 credits):**

The Elective will consist of dermatology outpatient clinics at Carilion Riverside Complex and consults at Carilion Roanoke Memorial Hospital. The Medical Student will do the patient's chart review, history taking, and physical examination. In consultation with the attending, the student will develop a differential diagnosis, plan the diagnostic evaluation and design a management plan for the patient's skin disease. The preceptor is the staff dermatologist and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 803*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903M. Elective - Gastroenterology (2 or 4 credits):**

Students will work with Faculty from the Department of Gastroenterology in the outpatient clinic at Carilion Riverside 3 and will assist with consults on hospitalized patients at Carilion Roanoke Memorial Hospital. Additionally, students will attend procedures in the endoscopy suite. Students will be exposed to a wide array of common and unusual gastrointestinal conditions. The Medical Student will review the patient's chart, obtain a pertinent history, and perform an appropriate physical examination. In consultation with the attending, the student will develop a differential diagnosis, plan the diagnostic evaluation and design management options for the patient's gastrointestinal disease. The preceptor is Dr. Vikas Chitnavis.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903N. Elective - Hematology-Oncology (2 or 4 credits):**

The Elective will consist of working primarily in the outpatient setting in conjunction with the faculty hematology/oncologist. The medical student will do the patient's chart review, history

taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and discuss the management with the attending. The preceptor is Dr. Lowell Inhorn and the location is Blue Ridge Cancer Care.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 9030. Elective - Medical ICU (2 or 4 credits):**

This elective is intended to expose medical students to a wide variety of acute and sub-acute medical pathologies and to enable them to provide physiologic support for patients who have suffered acute catastrophic insult. Students will gain experience in coordinating the management of critically ill patients with multiple health care providers and will apply evidence-based concepts to diagnosis, care, and outcome prediction of critically ill patients. The preceptor is the ICU attending and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903P. Elective - Nephrology (2 or 4 credits):**

The Elective will consist of inpatient/outpatient work in conjunction with the nephrologist. The medical student will learn about fluid management as well as dialysis management and the illnesses that typically accompany renal disease (HTN for example.) The preceptor is the attending of record from Valley Nephrology and the location is Roanoke Memorial Hospital and Valley Nephrology.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 903Q. Elective - Occupational Medicine (2 credits):**

In the United States the majority of citizens are employed. It is well known that a productive lifestyle is important to the mental and emotional wellbeing of an individual. Persons who suffer from chronic illness or injury that result in unemployment have significantly higher than average rates of drug and alcohol abuse, divorce, suicide and a decrease in life expectancy. This elective is a site specific elective. The preceptor is Dr. Hetzel Hartley. The elective will consist of seeing patients in the Carilion Clinic Occupational Medicine Clinic.

*Prerequisite(s): Years 1, 2 + MED 803*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 903S. Elective – Advanced Physical Medicine and Rehabilitation (2 credits):**

On this elective, students will learn how to assist individuals who have permanent impairments (paralysis, sensory loss, cognitive dysfunction, alteration of consciousness, decreased endurance, etc.) in identifying their remaining abilities and developing them to their maximum potential. There is a strong emphasis on the team approach, with communication as the vital link between team members, most importantly the patient and the patient's family. We will try to focus on issues that the students will be likely to see in their primary practices. On the Advanced PM and R rotation, the student will be engaged in discharge planning and follow-up planning and is expected in general to have a wider knowledge base of how to care for patients on the service. The student will make an oral presentation to the preceptor on a topic agreed

upon by the preceptor and the student. The M4 student will be expected to gain a level of independence on the Advanced PM and R elective that is indicative of their prior experience in a PM and R setting.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 903T. Elective – Advanced Dermatology (4 credits):**

This elective will consist of dermatology outpatient clinics at Carilion Riverside Complex and consults at Carilion Roanoke Memorial Hospital. The Medical Student will do the patient's chart review, history taking, and physical examination. In consultation with the attending, the student will develop a differential diagnosis, plan the diagnostic evaluation and design a management plan for the patient's skin disease. The student on the Advanced Dermatology rotation will review the literature and make a 15 minute oral presentation to the attending on a relevant topic agreed upon by the attending and the student. The student will be expected to be more actively engaged in diagnosis and treatment planning with skills congruent to having had a previous Dermatology rotation and will be expected to be more involved in the management of procedures in the office setting.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 908B. Elective - Radiation Oncology (2 or 4 credits):**

Students will learn the principles of radiation oncology as well as communication skills with patients who have been determined to have a malignancy which may be responsive to radiation. Students will also learn interprofessionalism through communication with techs, nursing staff, and possibly oncologists. The preceptor is Dr. David Buck and the location is Blue Ridge Cancer Care.

*Prerequisite(s): Years 1, 2 + MED 808*

*Co-requisite(s): None*

*Duration: 2or 4 weeks*

## Interprofessionalism

### **MED 900 IP-A. Elective - Clinical Quality (2 credits):**

Purpose: To provide an introduction to the fundamentals of efforts to ensure the quality and safety of clinical care provided in an inpatient setting. The preceptor is Dr. Ralph Whatley and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

## International

### **MED 910A. Elective - Global Health, Ghana (4 credits):**

This course provides a qualitative and quantitative review of global health issues that focus on culture and biomedicine, ethnomedicine, socioeconomic dimensions and societal demands and a 2-week in country clinical and community health experience. The goal of the rotation is to provide medical students with medical practice in resource-poor settings and the associated public health issues. The focus is primarily on vulnerable populations of developing countries, with some emphasis on community-based approaches to health issues. The rotation is intended to provide the medical student with a public health perspective as well as direct patient care experience. The location is Ghana.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 910B. Elective - Global Health, Mungeli (4 credits):**

This elective is an international elective in which there is a diverse experience in Surgery, Medicine, and OB-GYN. The preceptor is Dr. Henry and the location is Mungeli.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 910C. Elective - Global Health, Kazan State Medical University-Russia (4 credits):**

The purpose of this 4-week clerkship is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with healthcare in Kazan. The student will have an opportunity to participate in the longitudinal care of patients, review images and lab studies, learn and practice basic surgical technique. There will also be the opportunity to learn about Global Health, healthcare disparities, global development, cultural exchanges, international affairs, and medical education and in the culture of Russia. There may also be the opportunity to work in the Clinical Skills Center and with standardized patients.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 910D. Elective - Global Health, Saint-Lo, France (4 credits):**

The purpose of this 4-week clerkship is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with healthcare in Saint-Lô, France. The Memorial Hospital of Saint-Lô has paved the way for modern hospitals since WWII. When it opened in May 1956, it was commonly referred to by experts as "the most modern hospital in France or in Europe" and it still strives to be so. The hospital was built and is still partially funded by money from the USA, as part of reparations as a result of accidental friendly fire on city during the D-Day invasion. The student may have the opportunity to rotate through general medical units or specific subspecialty practices. Students are expected to participate in Grand Rounds and other educational programs related to their rotation. There are opportunities with the nursing school for interprofessional rounds and training. The student will have an opportunity to participate in the longitudinal care of patients, review images and lab studies, learn and practice basic surgical technique. There will also be the opportunity to learn about Global Health, healthcare disparities, global development, cultural exchanges, international affairs, and medical education and in the culture of France.



*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 910E. Elective - Global Health, Korea at Yonsei University, Wonju College of Medicine-Wonju (4 credits):**

The purpose of this 4-week clerkship is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with healthcare in Wonju, South Korea. Composed of a premedical school, medical school, nursing school, and school of dental hygiene, the Wonju College of Medicine emphasizes Christian-based medical education. The school has 147 full-time faculty members and affiliates with Wonju Christian Hospital, a partnership that enables students to have early clinical training. The student will have an opportunity to participate in the longitudinal care of patients, review images and lab studies, learn and practice basic surgical technique. There will also be the opportunity to learn about Global Health, healthcare disparities, global development, cultural exchanges, international affairs, and medical education and in the culture of Korea. There are other health professional schools on campus so opportunity exists for interprofessional rounds and training. There are likely to be other international medical students on campus.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

## Medical Education

### **MED 900 BS-C. Elective - Medical Education (2 credits):**

The purpose of this elective is to provide: an introduction to the fundamentals of adult learning, an opportunity to apply and improve teaching skills in a medical setting, and preparation as a future physician-educator. The student will learn to effectively facilitate in a small group learning process utilizing the principles of adult learning and skills of effective feedback, review and write cases for education and evaluation, and how to be an **active** member of the medical education team participating in basic curriculum design and development.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

## Neurology

### **MED 904A. Elective - Vascular Neurology (2 credits):**

Stroke accounts for more than ½ of all neurology inpatient admissions, and is the leading cause of neurologic mortality. This elective will provide education in acute stroke treatment, stroke prevention, and stroke diagnosis. The goals are to master current principles of the diagnostic evaluation of patients with cerebrovascular disease, become skilled in the acute treatment of stroke, and acquire proficiency in treatments to prevent stroke. The director is Dr. Schmidley and the preceptor depends on the schedule. This is a two week elective at Carilion Roanoke Memorial Hospital. The VTC assessment form is the method of assessment used.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 904B. Elective - Inpatient Consults (2 credits):**

This elective will be offered to fourth year medical students seeking a more extensive exposure to inpatient Neurology. This elective is intended for students interested in intensive care or hospitalist medicine, ER, neurology or neurosurgery. It deals with inpatients suffering from strokes, metabolic encephalopathies, seizures, and neurologic complications of non-neurologic conditions. In this setting, students will work with faculty attendings to evaluate patients on a busy consult service. Students will present their findings directly to the consult attending who will review the case with them. Appropriate supervision will be provided. There will be time to review the relevant literature prior to presenting these cases. The preceptor is Dr. James Schmidley. The elective rotation is located at Carilion Roanoke Memorial Hospital and is a two week elective. The VTC assessment form is the method used for assessment. This rotation is only offered in the “middle” two weeks of each 6 week block.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

### **MED 904C. Elective - Outpatient Neurology (2 credits):**

This elective will be offered to fourth year medical students seeking a more extensive exposure to outpatient Neurology. An individualized program will be prepared by the course director to suit the particular interests of each student. The student may choose from a wide variety of neurologic subspecialty experiences including movement disorders, epilepsy, EMG and neuromuscular disease, amongst others, but will also spend at least 50% of the time seeing general neurology consultations. Outpatient evaluation and management of neurological complaints is often challenging for physicians. Performance of simple exam skills and knowledge of a few clinical principles make it much easier to manage these patients in an efficient and cost effective manner. The preceptor is a Neurology faculty member and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

## Obstetrics and Gynecology

### **MED 905A. Elective - Reproductive Endocrinology and Infertility (2 credits):**

This elective is designed for a student interested in obstetrics and gynecology or primary care with a strong emphasis on Women's Health. This rotation will expose the student to the evaluation and management of patients with infertility problems, endometriosis, menstrual abnormalities, polycystic ovary syndrome and uterine fibroids. The student will also gain exposure and learn to perform transvaginal ultrasound in infertility and gynecologic patients. This is primarily an outpatient rotation but will include one half day a week in the Operating Room with Dr. Slackman. This rotation is offered November through March. The preceptor is Dr. Slackman and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 805*

*Co-requisite(s): None*

*Duration: 2 weeks*

### **MED 905B. Elective - Urogynecology (2 credits):**

This elective is designed for a student interested in obstetrics and gynecology, primary care with a strong emphasis on Women's Health or a surgical subspecialty. This rotation will expose the student to the evaluation and management of patients with pelvic organ prolapse and urinary incontinence. The student will be involved in the outpatient management of patients with the above conditions. They will become familiar with medical and surgical management options. The student will have an opportunity to participate in fitting pessaries and observing Urodynamics and outpatient cystoscopy. At least one day a week will be spent in the operating room and the student will be responsible for following postoperative patients during their hospital stay. Students will also participate in Friday morning didactics with the residents. The preceptor is Dr. Jon Gleason and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 805*

*Co-requisite(s): None*

*Duration: 2 weeks*

### **MED 905C. Elective - Acting Internship in Gynecologic Oncology (4 credits):**

This is a sub-internship elective designed for a student interested in obstetrics and gynecology or a surgical subspecialty. The student will gain experience in the outpatient evaluation of patients with potential gynecologic malignancies. Students will observe and assist with surgical cases including robotic cases. The student will gain an understanding of postoperative management of complicated surgical patients and will round on these patients with the gynecologic oncology team as an acting sub-intern. The student will be expected to present a topic of their choosing to the team at the end of the rotation or participate in an oral exam given by one of the gynecologic oncologists. The 4<sup>th</sup> year student will participate in the same didactic curriculum with the residents. There is no call responsibility but the student will be expected to participate in inpatient rounds during 2 of the 4 Saturdays. The preceptor is Dr. Janet Osborne and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 905D. Elective - Maternal Fetal Medicine (4 credits):**

This elective is designed to provide the participating student with exposure to the breadth of high risk obstetrics. The student will be expected to evaluate and manage high risk obstetrical patients in the office and hospital setting. In the outpatient setting, the student will participate in the genetic counseling sessions, ultrasounds, maternal fetal medicine consults and prenatal visits. The student will interact with the Maternal Fetal Medicine attendings, ob residents, genetic counselors and ultrasound technicians. The student will gain experience with the management of acute and high-risk obstetrical conditions by rounding daily on the antepartum service with the residents and faculty. The student will **not** be participating in intrapartum management during this rotation (not performing vaginal deliveries or cesarean deliveries). The preceptor is Dr. Larry Dennis and the location is the outpatient office and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 905E. Elective - OB-GYN Boot Camp (2 credits):**

This elective is designed for the student applying for an OB-GYN residency. Didactic and procedural skills sessions have been designed for office practice, OB, and GYN and are designed to increase a student's readiness for patient care during an OB-GYN residency.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 905F. Elective – OB-GYN New River Valley (4 credits):**

The elective is designed to provide an opportunity for the student to gain experience in the ambulatory and hospital setting caring for both obstetrical and gynecologic conditions. The student will be expected to participate in the evaluation and management of common ambulatory gynecologic complaints including but not limited to contraception, abnormal uterine bleeding, pelvic pain and well women care. Students will be involved in the preoperative, surgical, and postoperative care of patients with gynecologic conditions requiring minor and major surgery. The student will also participate in the ambulatory and inpatient management of obstetrical patients. They will provide routine prenatal care as well as learn about management of more complex conditions such as gestational diabetes and hypertension in pregnancy. Students will also assist with vaginal and cesarean deliveries and participate in the postpartum care of these patients. This elective is to assist the student in understanding the type of care that can be offered in a rural setting.

*Prerequisite(s): Years 1, 2 + first half of year 3 + MED 809*

*Co-requisite(s): None*

*Duration: 4 weeks*

## Orthopaedics

### **MED 909A. Elective - Orthopaedic Third Year (2 or 4 credits):**

To improve understanding of the spectrum of care required for orthopaedic patients and the concept of continuity of care, the hybrid elective in Orthopaedics/MSK will include at least one day of OR exposure per week with the goal of an integrated understanding of perioperative assessment, rationale of surgical intervention for a specific subset of patients and orthopaedic issues, surgical anatomy, and postoperative management. Exposure to anesthesia principles and acute care pain management are also components of this rotation. The preceptor is Dr. TK Miller or Ortho faculty and the location is the orthopaedic outpatient facilities and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

### **MED 909S. Elective - Orthopaedics A, Specialty (2 or 4 credits):**

This option is designed for those students considering a career in Orthopaedic Surgery. It is available from July-November only and priority is given to students who have completed an MS3 orthopaedic elective or MS3 orthopaedic surgical selective. It is designed to allow increased exposure to Orthopaedic subspecialties and, more important, one on one faculty interaction. Each 4 week block is divided into 2 wk rotations with students assigned to a single faculty member for each of the two weeks. Students will follow the attending schedule (including On-Call\* when applicable). ALL rotations include a mandatory 2 wk Trauma/Fx service rotation. Students may select one specific subspecialty rotation(s). On occasion, one of the two week blocks may be divided into 1 wk rotations to increase subspecialty exposure (see below). This option (1 wk rotation) will be offered only to students who have done a 4 week MS3 orthopaedic elective. The preceptor is Dr. TK Miller or Ortho faculty and the location is the orthopedic outpatient facilities and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3 + MS3 Ortho Selective

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

### **MED 909T. Elective - Orthopaedics B, Non-Specialty (2 or 4 credits):**

This option is designed for those students considering a career in specialties that will have clinical overlap with orthopaedics and musculoskeletal care. It is available from November-May and previous orthopaedic elective exposure is not required. It is designed to allow increased exposure to Orthopaedic subspecialties and a large number of orthopaedic faculty. Each 4 week block is divided into 2 wk rotations with students assigned to a subspecialty for each of the two weeks. Students will be assigned to faculty and office or OR on a day by day schedule. While there are no mandatory rotations, time on the Trauma/Fx service rotation is advised. Students may select specific subspecialty rotation(s) and every effort will be made to honor requests. On occasion, one of the two week blocks may be divided into 1 wk rotations to increase subspecialty exposure (see below). Rotation selection and 1 wk options are dependent on faculty availability and co-ordination with MS3 rotations. The preceptor is Dr. TK Miller or Orthopaedic faculty and the location is the orthopedic outpatient facilities and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration: 2 or 4 weeks*

**MED 909DD. Elective - Ortho-ER (2 or 4 credits):**

This Orthopaedic elective is designed for the student who is interested in Primary Care or Emergency Medicine. It is designed to give acute orthopaedic injury exposure to the student who may see this type of injury in the above noted settings.

*Prerequisite(s): Years 1, 2, MED 803 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

## Pediatrics

### **MED 906A. Elective - Pediatric Endocrinology (2 or 4 credits):**

The Elective will be primarily an outpatient experience, evaluating patients presenting for consultation or follow up to the pediatric endocrinology clinic. Students may also participate in inpatient consultations when they are available and educationally relevant. Common problems encountered will include type 1 and type 2 diabetes, obesity and the metabolic syndrome, disorders of the thyroid, pituitary, and adrenal glands, and disorders of growth, puberty, and bone/calcium. The preceptor for this elective is Dr. Erica Reynolds and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 806*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 906B. Elective - Pediatric Cardiology (2 or 4 credits):**

The mission of this rotation is to provide an in depth learning experience in the field of non-invasive Pediatric Cardiology. Emphasis will be placed on outpatient management of management of children with heart disease. Students will be participating in non-invasive testing for heart disease including electrocardiography, echocardiography, fetal echocardiography, and stress testing. The student will become familiar with the work up and management of pediatric patients with murmurs, chest pain, palpitations, and syncope. Students will evaluate patients with suspected cardiovascular abnormalities with special emphasis on the longitudinal management of patients with congenital heart disease. The students will develop clinical skills in cardiac auscultation and interpretation of pediatric ECGs. Learning environments include the Roanoke pediatric cardiology clinic as well as multiple outlying clinics and inpatient consultation. The students will attend teaching and patient care conferences. The preceptor for this elective is Dr. Joelle Miller and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 806*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 906C. Elective - Pediatric Pulmonary/Allergy (2 or 4 credits):**

The students will rotate in the inpatient ward, PICU, NICU, the outpatient clinics and experience the Bronchoscopy Lab & PFT lab. Rotations will include rounding with the physicians in these areas. In some instances students will examine patients, perform physical examinations and come up with differential diagnosis and a proposed work up and treatment plan in both an inpatient and outpatient setting. Goals and curriculum components for this elective will be similar to those of the pediatric residency program. The preceptor for this elective is Dr. Laura Dziadzio and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 806*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 906D. Elective - Pediatric Gastroenterology (2 or 4 credits):**

The elective rotation is intended to develop the medical student's clinical skills and enhance their fund of knowledge in the evaluation and management of inpatient and outpatient GI, Hepatology, and Nutrition disorders. The preceptor is Dr. Mike Hart and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.



*Prerequisite(s): Years 1, 2 + MED 806*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 906E. Elective - Acting Internship in Pediatrics (4 credits):**

The Elective will consist of caring for patients on the pediatric inpatient service. The fourth year medical student will work with the pediatric inpatient team in direct patient care of hospitalized patients on the general pediatric inpatient service. The fourth year medical student will take the history and perform the physical examination at the time of admission. From this information the medical student will develop a differential diagnosis, plan the diagnostic evaluation and design the management of the patient. The medical student will then take primary responsibility of the patient until they are discharged from the hospital. They will be directly supervised by an upper level (PGY-2, PGY-3) resident and the pediatric attending physician. The preceptor is Dr. Mike Burbridge and the rotation is at Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 906F. Elective - Community Pediatrics (2 credits):**

The mission of this rotation is to provide an in depth learning experience in the setting of a busy outpatient pediatric clinic. This elective will emphasize preventive and anticipatory care as well as sick office care within the setting of a pediatric medical home.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 906G. Elective - Developmental Pediatrics (2 credits):**

The Elective will introduce the Medical Student to the evaluation and management of special-needs children by participation in the Child Development Clinic. The Medical Student will share in the patient's chart review, history taking, and physical examination. From this information the Medical Student will generate a differential diagnosis, plan the diagnostic evaluation, and create a management plan in consultation with the attending physician. The rotation is in the outpatient clinic. This is also a site specific elective.

*Prerequisite(s): Years 1, 2, MED 803, MED 805 + MED 806*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 906H. Elective - Genetics and Genetic Testing (2 or 4 credits):**

The Elective will consist of consulting on patients with known or suspected genetic disorders. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will generate a differential diagnosis, plan the diagnostic evaluation, and create a management plan. The preceptor for this elective is Dr. Emily Doherty and the rotation is in the outpatient clinic.

*Prerequisite(s): Years 1, 2, MED 803, MED 805 + MED 806*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 906I. Elective - Leadership in Academic Medicine (2 or 4 credits):**

This elective will give the student exposure to the four major areas within academic medicine and leadership that can provide the basis of a future career. In addition to the traditional three-legged stool of academic medicine (teaching, research, and clinical care), the student will learn how the umbrella of administration provides the glue that makes it possible for the other roles to coexist and thrive. The use of journaling and the technique of critical reflection will be utilized throughout the elective to enhance self-directed learning and will contribute to the final assessment of the student's performance. The preceptor for this elective is Dr. Alice Ackerman and the rotation is in Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 906J. Elective - Neonatal ICU (2 or 4 credits):**

General Objectives

- Obtain a broad understanding of the medical problems afflicting infants during the first month of life.
- Learn generally applicable principles in the NICU setting.
- The preceptor for this elective is Dr. Ann Heerens and the rotation is at Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 906K. Elective - Pediatric Hematology/Oncology (2 credits):**

The Elective will consist of consulting on patients with hematological and oncological conditions. The Medical Student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and design the management of the patient. The student may observe lumbar punctures and bone marrow tests as scheduled during their rotation. They will also be required to give a 15 minute talk on a topic agreed upon by the attending if on the four week rotation. The preceptor is Dr. Mandy Atkinson and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2 + MED 806

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 906L. Elective - Pediatric ICU (2 or 4 credits):**

The students will spend the elective time in the ICU and will have potential exposure to a wide range of illnesses from multiple organ systems. The student will be expected to develop skills in interacting with critically ill children and also with the parents of these children. The preceptor for this elective is Dr. Virginia Powell and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 906M. Elective - Pediatric Neurology (2 or 4 credits):**

The Elective will consist of consulting on patients with the pediatric neurologists. The Medical Student will do the patient's chart review, history taking, and physical examination. From this

information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and design the management of the patient. The student will make a presentation to the preceptor if doing the four week rotation. The preceptor for this elective is Dr. Scott Otallah and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 806*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

## Psychiatry

### **MED 907A. Elective - Child and Adolescent Psychiatry- Outpatient (2 or 4 credits):**

The rotation is based in the psychiatry department outpatient child and adolescent clinic. Students will see children between the ages of 5 and 17 under the close supervision of a child psychiatry fellow and board-certified child psychiatrist. Students will also interact with patient family members and caretakers. Some exposure to liaison with public social service agencies will occur. Problems likely to be encountered in this patient population include mood disorders, behavioral dyscontrol disorders, reactive attachment disorders, attention disorders, and learning disabilities. The student will accompany a board-certified child and adolescent psychiatrist during the course of providing outpatient treatment. A child and adolescent fellow may also be involved in the teaching. The age range of the patients treated is between 5 and 17 years old. The student will be able to observe both psychotherapy and pharmacotherapy with the pre-adult patient, as well as the importance of family interactions. The preceptor is Dr. Felicity Adams and the location is Carilion Roanoke Memorial Hospital, Rehabilitation Center.

*Prerequisite(s): Years 1, 2 + MED 807*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 907B. Elective - Child and Adolescent Psychiatry- Inpatient (2 or 4 credits):**

The student will be based on a 12 bed unit taking children and adolescents between the ages of 5 and 17. The student will function as an integral member of the treatment team including a board-certified child psychiatrist, child psychiatry fellow, general psychiatry resident, psychologist, social worker, and nursing staff. The student will participate in rounds and will meet with patients both in group and individually. Close supervision will be given by the child psychiatry fellow and attending. Problems likely to be encountered in this patient population include mood disorders, substance use disorders, behavioral dyscontrol disorders, reactive attachment disorders, attention disorders, and psychosis. The student will be able to observe both psychotherapy and pharmacotherapy with the pre-adult patient, as well as the importance of family interactions. The preceptor is Dr. Felicity Adams and the location is Carilion Roanoke Memorial Hospital, Rehabilitation Center.

*Prerequisite(s): Years 1, 2 & MED 807*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 907C. Elective - Consultation Liaison Psychiatry (2 or 4 credits):**

The rotation is based primarily at Carilion Medical Center. Patients on medical, surgical, and rehabilitation units who are in need of psychiatric care will be seen under the supervision of a board-certified psychosomatic psychiatrist. Age range of this population is 18 to 100. Problems likely to be encountered include mood disorders, psychosis, substance use disorders, adjustment to acute medical problems, delirium, and exaggeration of symptoms. The student will accompany a board-certified psychosomatic psychiatrist during the course of providing inpatient consultation at Carilion Medical Center. A first- or second-year psychiatric resident may also be involved in the teaching. The age range of the patients treated is between 18 and 90 years old. The student will be able to observe how the psychiatrist can usefully contribute to the care of medically or surgically hospitalized individuals. The preceptor is Dr. Bush Kavuru and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Year 1, 2 + MED 807*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 907D. Elective - Geriatric Psychiatry (2 or 4 credits):**

The student will participate in a wide spectrum of treatment then use for geriatric psychiatry. Most of their time will be spent in an outpatient geriatric medicine and psychiatry clinic with geriatric psychiatry specialists. Some time will be spent going to nursing homes to care for the elderly. Limited exposure to geriatric medical/surgical consultation will occur. Supervision and all venues will be by a board-certified geriatric psychiatrist and to a lesser extent by a geriatric psychiatry fellow. Problems likely to be encountered in this patient population include mood disorders, grief, dementia, end of life issues, and adjustment to continuing medical problems. The student will accompany a board-certified geriatric psychiatrist during the course of providing outpatient treatment. A geriatric fellow and/or third- or fourth-year psychiatric resident may also be involved in the teaching. The age range of the patients treated is between 65 and 100 years old. In addition, the student may opt to spend one day going to geriatric nursing homes with a psychiatrist. The student will be able to observe both psychotherapy and pharmacotherapy with the geriatric patient, as well as the importance of family support, variations in physiology and metabolism in the aging individual, and end-of-life issues. The preceptor is Dr. Kemi Bankole and the location is the outpatient office and nursing homes in the Roanoke Valley.

*Prerequisite(s): Years 1, 2 + MED 807*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 907E. Elective - Psychiatry Acting Internship (4 credits):**

During the AI, the student will work with the assigned attending, resident and students as an active member of the treatment team on the inpatient psychiatry units R4 and R5. The student will be assigned a maximum of 6 patients for whom you will be an active team leader on the treatment team under the supervision of the resident and attending physicians.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 907F. Elective – Acting Internship in Psychiatry, Catawba (4 credits):**

During the AI, you will work with your assigned attending, resident and students as an active member of the treatment team on the inpatient psychiatry units at Catawba. You will be assigned a maximum of 6 patients for whom you will be an active team leader on the treatment team under the supervision of the resident and attending physicians.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 907. Elective – Inpatient Psychiatry, Catawba (2 credits):**

During the elective, you will work with your assigned attending, resident and students as an active member of the treatment team on the inpatient psychiatry units at Catawba. You will be assigned a maximum of 6 patients for whom you will be an active team leader on the treatment team under the supervision of the resident and attending physicians.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

## Radiology

### **MED 908A. Elective - Interventional Radiology (2 credits):**

The elective will consist of further clinical experience in the subspecialty of Interventional Radiology to include management of conditions in genitourinary, gastrointestinal, vascular, biliary, neurological and oncologic interventions in the spectrum of various clinical conditions. Student will be exposed to daily teaching sessions with interventional radiologists and attend multidisciplinary conferences that incorporate patient management issues. The preceptor is Dr. John Wessinger and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 808*

*Co-requisite(s): None*

*Duration: 2 weeks*

### **MED 908C. Elective - Breast Imaging (2 credits):**

The elective will consist of further clinical experience in the subspecialty of breast imaging to include the modalities of screening and diagnostic mammography, ultrasound, and Magnetic Resonance Imaging (MRI) in the imaging diagnosis of benign and malignant diseases of the breast. Student will be exposed to daily teaching sessions at the Breast Care Center and attend multidisciplinary conferences that incorporate patient management issues. The preceptor is Dr. Eileen Kenny and the location is the Breast Care Center.

*Prerequisite(s): Years 1, 2 + MED 808*

*Co-requisite(s): None*

*Duration: 2 weeks*

### **MED 908D. Elective - Musculoskeletal Radiology (2 credits):**

The elective will consist of further clinical experience in the subspecialty of musculoskeletal radiology to include the modalities of Computed Tomography, Magnetic Resonance Imaging (MRI), and arthrography in the imaging diagnosis of musculoskeletal diseases. Student will be exposed to daily teaching sessions with radiologists and attend multidisciplinary conferences that incorporate patient management issues. The preceptor is Dr. Kelly Whitmer and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 808*

*Co-requisite(s): None*

*Duration: 2 weeks*

### **MED 908E. Elective - Neuroradiology (2 credits):**

This two week elective is for the student with an interest in pursuing a residency in the neurosciences or career in neuroimaging. The intent is to provide an environment that provides the student an opportunity and time to work on a focused project in neuroimaging. This might be a case report, limited research project, preparation of a grand rounds topic or adding cases to a teaching file or online data base. It is required that the interested student meet with the neuroradiologist several months ahead of time to discuss and choose a project, so the elective time can be spent most productively. This is especially important if the project involves the use of resources that may not be immediately available, or involves a cooperative effort with other researchers or technical staff. The preceptor is Dr. David Keyes and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 808*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 908F. Elective – Advanced Interventional Radiology (2 credits):**

This 2 week elective will allow students who have previously completed the Interventional Radiology elective to learn more advanced aspect of interventional radiology including neurointerventional and oncological interventional radiology. Students will observe and gain knowledge in advanced neurointerventional procedures such as acute stroke, intracranial aneurysms, and AV malformations. Students will also observe and gain knowledge in radiofrequency ablation and catheter directed therapies.

*Prerequisite(s): Years 1, 2, 3 + MED 908A*

*Co-requisite(s): None*

*Duration: 2 weeks*

## **Surgery**

### **MED 909C. Elective - Neurosurgery Spine Track (2 or 4 credits):**

Students on this rotation will partner with the Director of Complex Neurosurgical Spine Surgery, Dr. Nicholas Qandah. They will go through the work week “joined at the hip” with Dr. Qandah. Dr. Qandah is a lightning bolt-energized surgeon and an exceptional teacher. The days will be action-packed and moving at the speed of light. The experience will include about 40% of the week in the neurosurgery and/or Spine Center clinic, and 60% in the operating room and inpatient floors. The student will gain a deep appreciation for the evaluation and management of degenerative spinal disorders, radiculopathy, myelopathy, spinal column tumors, spinal column fracture, spinal column deformity, chronic spinal pain, scoliosis, and more. Surgical experiences will include the opening and closing of large spinal wounds, pedicle screw placement, laminectomy, fusion, kyphoplasty, and more. Students will participate in Tuesday afternoon academic sessions and will always be welcome on rounds and in the operating room. The preceptor is Dr. Qandah and the location is the outpatient office and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 909D. Elective - Neurosurgery Peds Track (2 or 4 credits):**

In this rotation, students will work closely with two pediatric neurosurgery oriented attending surgeons (Drs. Lisa Apfel and Gary Simonds). Dr. Apfel will be the principle surgeon on this rotation. She is known for her tremendous work rate and her fantastic bedside manner. Students on this rotation will not only learn the nuts and bolts of pediatric neurosurgery but will also gain a deep appreciation for how to relate to critically ill children and their families. This will involve both outpatient clinic work and inpatient evaluations and surgeries. Students will experience patients with disorders such as hydrocephalus, spina bifida, tethered spinal cord, head trauma, spine trauma, brain tumors, non-accidental trauma, chiari malformation, skull masses, craniofacial synostosis and deformity, and more. The pediatric volume of the service is variable and a healthy mix of adult neurosurgery may be mixed into the rotation. Students will participate in Tuesday afternoon academic sessions and will always be welcome on rounds and in the operating room. The preceptor is Dr. Apfel and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

### **MED 909E. Elective - Neurosurgery ICU Track (2 or 4 credits)**

Students will spend a lot of time in the emergency room evaluating acute neurosurgical issues and interweaving their work with the trauma team. They also will spend time in the ICU setting once the acute situation has been initially identified and evaluated. The preceptor is the Neurosurgical faculty and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*



**MED 909F. Elective - Neurosurgery OR Track (2 or 4 credits):**

For the surgery hound! In this track, students will spend the vast majority of their time in the operating room. They will participate in the daily operating schedule. They will be expected to evaluate the patients and their radiographs in the pre-op area and then discuss the choice and execution of procedures with attending surgeons and residents involved in the procedure. They can anticipate the development of skills in sterile technique, prepping and draping, operative positioning, opening and closing of surgical wounds, control of bleeding, tying, suturing, drain placement, burr hole placement, pedicle screw insertion, laminectomy, ventricular catheter placement, lumbar catheter placement, craniotomy, bone drilling, and more. They will develop an appreciation for the fragility of the nervous system and will develop skills in the delicate manipulation of such tissues. Students will participate in Tuesday afternoon academic sessions and will always be welcome on rounds and in the operating room. The preceptor is the Neurosurgery faculty and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909G. Elective - Neurosurgery Research Track (2 or 4 credits):**

Students on the research track work predominately on on-going projects of the team although we are open to initiating novel proposed projects). They will still participate in Tuesday afternoon academic sessions and will always be welcome on rounds and in the operating room. Students will work with a faculty mentor and a resident mentor/partner. Skills will be built in study design, literature search, data accumulation, synthesis. They will share authorship of finished research projects with team members (posters, presentations, papers). The preceptor will be the chosen faculty member/mentor and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909H. Elective - Anesthesia (2 or 4 credits):**

The Goal of the rotation is to provide you, the medical student, a “hands on” exposure to the field of Anesthesia and Anesthesiology and can be taken by a third or fourth year student. You will work predominantly with Anesthesiologists, but may also work with Certified Registered Nurse Anesthetists as the month presents itself for scheduling purposes. At the end of the rotation, you should have a basic understanding of the principles of pre-anesthetic evaluation, preparation, and anesthetic care, including history, physical examination, assessment of physiologic state, categorization of anesthetic risk, and care throughout the perioperative period. You will have participated with your anesthesiologist preceptors in placement of monitors, conduction of anesthetics including induction, intubation, maintenance, emergence, extubation and postanesthetic recovery care. You may also have opportunities to gain experience in regional anesthesia and sub-specialty anesthesia areas such as pediatric, obstetric, thoracic, cardiac, and neurosurgical anesthesia. The preceptor is the Anesthesia faculty and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909I. Elective - General Surgery (2 credits):**

The student will gain experience in the evaluation and management of acute general surgery problems on a busy surgical consult service. This elective allows for increased patient care responsibilities. The preceptor is the inpatient Surgery faculty attending and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 909J. Elective - Breast Surgery (2 credits):**

This 2-week elective with the Breast service managing patients with benign and malignant breast disease allows the student to gain experience in the management of breast disease with a focus on surgical care in a multidisciplinary patient care setting. The second week of rotation spent gaining experience on the plastic and reconstructive aspect of breast patient care. This can be done during weeks 1-4 of the M3 rotation schedule. The preceptor is Dr. Davenport and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 909K. Elective - Cardiothoracic Surgery (2 or 4 credits):**

Welcome to the cardiothoracic surgical service. This is new for all of us but we are very excited to have you. We operate every day of the week, and one surgeon has office each day. Below is a list of topics that we feel represents the basic knowledge base in CT surgery. It is certainly not all-inclusive, but is likely more than you will need to know to do well on the exam. This is often a very busy service, so you may have to actively pursue us and your knowledge acquisition. All topics will not, and cannot, be covered in a didactic format in 2 weeks. Student will gain experience in operative and perioperative management of cardiac and thoracic surgical problems. The preceptor is Dr. Scott Arnold and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909L. Elective - CNRV General Surgery (2 or 4 credits):**

The student will gain experience in surgery as practiced in a smaller community hospital setting with a mix of elective and emergent patient care. The preceptor is Dr. Downing and the location is Carilion New River Valley Medical Center.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909N. Elective - Colorectal Surgery (2 credits):**

This 2-week elective with General Surgeons with interest/expertise in colorectal surgery managing a broad range of problems including neoplasm, diverticulitis, inflammatory bowel disease, anorectal disorders. The student will gain experience in colorectal disease and management. The preceptor is the faculty attending and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 weeks*

**MED 909O. Elective - Otolaryngology, Head & Neck Surgery-ENT (2 or 4 credits):**

The overall goal of the Otolaryngology elective (specialty clerkship) is to provide medical students preliminary exposure to the specialty of Otolaryngology, Head and Neck Surgery. This includes an introduction to subspecialties within the field such as otology, neurotology, audiology, head and neck surgery, pediatrics, laryngology, allergy, facial plastic and reconstructive surgery, and maxillofacial trauma. The elective will provide medical students with information about the diagnosis and management of disorders of the ear, nose, and throat in an inpatient and outpatient setting. It will also provide exposure to various patient populations with acute and chronic head and neck pathologies. The preceptor is Dr. Bill Magdcyz and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909P. Elective - Neurosurgery Consultation Track (2 or 4 credits):**

Students will spend the majority of their rotation evaluating Neurosurgery and Spine Center outpatients. They will develop an exceptional acumen in neurological history taking, exam, differential diagnosis, synthesis, and treatment planning. They will learn how to efficiently move a number of patients through a clinic. They will develop patient interaction skills. They will develop a strong background in neuroradiologic evaluation. They will gain an in-depth appreciation for the evaluation and management of spinal disorders and also various brain and peripheral nerve disorders. They will partner with attending neurosurgeons and residents each day. They will independently evaluate each of their patients, review the patient's studies, and formulate a diagnosis and treatment plan prior to discussing with their neurosurgical partners. Students will be encouraged to follow their patients through their entire neurosurgical experience including inpatient care and surgery. Students will participate in Tuesday afternoon academic sessions and will always be welcome on rounds and in the operating room. The preceptor is the Neurosurgery faculty attending and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2 + MED 809*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909Q. Elective - Neurosurgery Acting Internship (4 credits):**

This track is the most demanding and rigorous offered by the Carilion Clinic Neurosurgery team. In this rotation the medical student acts essentially as a neurosurgical intern. They are assigned a palette of inpatients with whom they care for and follow throughout the patients' hospitalizations. They will spend a sizable amount of time in the ICU's, on the floors, and in the operating room. They will write regular notes and will interact intimately with patients and their families. They will take neurosurgical call with a resident one in every four nights. They will participate in Resident Clinic every Tuesday morning. They will gain an appreciation of the full gamut of neurosurgical issues encountered in a busy academic/clinic practice. They will acquire skills in inpatient and outpatient neurosurgical evaluation, the neurologic exam, surgical tissue manipulation, neurological critical care, neuroradiology, patient and family interaction, and

much more. The preceptor is Dr. Gary Simonds and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 909R. Elective - Ophthalmology (2 or 4 credits):**

The Elective will consist of working in the outpatient setting in conjunction with the faculty ophthalmologist. The medical student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and discuss the management with the faculty ophthalmologist. The preceptor is the faculty ophthalmologist and the location is the outpatient office.

*Prerequisite(s): Years, 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909V. Elective - Pediatric Surgery (2 or 4 credits):**

This two or four week rotation will introduce the medical student to common surgical problems seen in the neonate, infant, and younger children. Emphasis will be placed on efficiently working up and treating pyloric stenosis, abdominal pain, necrotizing enterocolitis, intestinal obstruction, and inguinal hernia in this age group. The student will also be introduced to more common congenital problems including abdominal wall defects, head and neck lesions, thoracic masses, and GU and GI tract anomalies. Common pediatric hematologic and oncologic conditions will also be reviewed. The physiology and nutrition of babies and children will also be emphasized as it relates to the surgical care of these patients. Common procedures specific to this age group like venous cutdown and airway management will be covered as well. Student will gain experience in the surgical management of common and less common pediatric surgical issues. The preceptor is Dr. Terri Wattsman and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

**MED 909W. Elective - Plastic Surgery (4 credits):**

The student on the Plastic Surgery service affords students the ability to further their development by being involved in the care of the both elective and emergent patients who are cared for by the Plastic Surgeons. This is both an inpatient and outpatient 4-week rotation. The preceptor is Dr. Feldmann and the location is the outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s): Years 1, 2, 3*

*Co-requisite(s): None*

*Duration: 4 weeks*

**MED 909X. Elective - Surgical ICU (2 credits):**

The student is expected to participate in daily rounds in the ICU and function as a sub-intern. He/she will present assigned patients on rounds, attend all lectures and conferences and read required material. Students will also have the opportunity to do procedures under close

supervision. There will be night and weekend call, but no weekend rounds. The preceptor is Dr. Bradburn and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 909Y. Elective - Trauma Surgery (2 or 4 credits):**

The purpose of this course is to gain familiarity in initial evaluation of trauma patients including trauma alerts and consultations, management of post trauma problems. Activities include: attendance and participation in the assessment and resuscitation of acutely injured patients in the emergency room; call (to be arranged); longitudinal management of selected patients through the emergency department, operating room and intensive care units, to recovery; observation of pre-hospital care by accompanying rescue squads on their calls; and selected readings in resuscitation, critical care and trauma management. The student will participate on the trauma service as a student member of the trauma team. Time for regular attendance at scheduled trauma conferences and individual preceptorial conferences is provided. The preceptor is Dr. Bryan Collier and the location is the trauma clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 or 4 weeks

**MED 909Z. Elective - Vascular Surgery (2 credits):**

Student will gain experience in diagnosis and surgical management of vascular disease and perioperative patient care. The preceptor is Dr. Drougas and the location is Dr. Drougas' outpatient clinic and Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 909BB. Elective - Advanced Anesthesiology (2 credits):**

The Goal of the rotation is to provide you, the medical student, a "hands on" exposure to the field of Anesthesia and Anesthesiology. This is essentially considered as a rotation to build upon your broad knowledge of the third year utilizing knowledge of, for example, fluid balance. You will work predominantly with Anesthesiologists, but may also work with Certified Registered Nurse Anesthetists as the month presents itself for scheduling purposes. At the end of the rotation, you should have a basic understanding of the principles of pre-anesthetic evaluation, preparation, and anesthetic care, including history, preceptors in placement of monitors, conduction of anesthetics including induction, intubation, maintenance, emergence, extubation and postanesthetic recovery care. You may also have opportunities to gain experience in regional anesthesia and sub-specialty anesthesia areas such as pediatric, obstetric, thoracic, cardiac, and neurosurgical anesthesia. The preceptor is the Anesthesia faculty and the location is Carilion Roanoke Memorial Hospital.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 909EE. Elective – General Surgery Acting Internship (4 credits):**

The purpose of this 4-week elective is to allow the student an ability to work with Dr. Mark Smith's surgery service which handles surgical intervention and peri-operative patient care, and to function at an acting internship level. Students will have the opportunity to experience a typical general surgery practice and will become familiar with the conditions treated by general surgeons, with emphasis on the pathophysiology of surgical conditions (basic science), pre-operative evaluation and preparation, operative treatment, post-operative care and follow up (clinical science).

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 4 weeks

**MED 909FF. Elective – General Surgery/Trauma Night Float (2 credits):**

The purpose of this 2-week elective is to allow the student an ability to work with the General Surgery/Trauma services which handle surgical intervention and peri-operative patient care and gain not only knowledge/patient care skills but time management skills to offer quality care while managing multiple aspects of patient care.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 2 weeks

**MED 909GG. Elective – Acting Internship in Surgical ICU (4 credits):**

The student is expected to participate in daily rounds in the ICU and function as an acting intern. He/she will present assigned patients on rounds, attend all lectures and conferences and read required material. Students will also have the opportunity to do procedures under close supervision. There will be night and weekend call, but no weekend rounds.

*Prerequisite(s):* Years 1, 2, 3

*Co-requisite(s):* None

*Duration:* 4 weeks

**MED 909HH. Elective – Urology (4 credits):**

The Elective will consist of working both in the outpatient and inpatient settings in conjunction with the faculty urologists. In the outpatient setting, the medical student will do the patient's chart review, history taking, and physical examination. From this information the Medical Student will develop a differential diagnosis, plan the diagnostic evaluation and discuss the management with the faculty urologist. In the inpatient setting, the student will be expected to participate in surgical procedures under direct supervision of the faculty physicians.

Additionally, the student will have the opportunity to see urologic consults in the inpatient setting. In this case, the student will be expected to do a chart review, obtain the relevant history and data, perform a physical examination, develop a differential diagnosis, and formulate a management plan to discuss with the attending physician.

*Prerequisite(s):* Years 1, 2, MED 803

*Co-requisite(s):* None

*Duration:* 4 weeks

## **Away Elective**

### **MED 999 Elective - Away Elective (2, 4, or 6 credits) :**

This course notates students enrolled in senior away electives at U.S. LCME medical schools and independent academic medical centers that are members of the Council of Teaching Hospitals and Health Systems (COH).

*Prerequisite(s): Year 1, 2, 3 + MCC Approval*

*Co-prerequisite(s): None*

*Duration: 2, 4, or 6 weeks*

999-2 (2 week Away Elective)

999-4 (4 week Away Elective)

999-6 (6 week Away Elective)

## Independent Study

### **MED 911 Elective - Step 2 Preparation Independent Study (2, 4, or 6 credits):**

The focus of this elective is to provide structured study time and educational resources for students who have been required to delay their Step 2 examination due to not achieving a target practice test score or for students who have taken and failed the Step 2 examination. Students will create a structured study plan and will work with the Senior Dean for Academic Affairs (or designee) in collaboration with the Associate Dean for Student Affairs and appropriate faculty to implement this independent study plan.

*Prerequisite(s): Year 1, 2, 3*

*Co-prerequisite(s): None*

*Duration: 2, 4, or 6 weeks*

911-2 (2 week Independent Study Elective)

911-4 (4 week Independent Study Elective)

911-6 (6 week Independent Study Elective)



## Research

### **MED RES. Elective - Research (2 or 4 credits)**

This elective is for the student who will be spending time working on their research project. The student will spend time continuing to learn the principles of Research as they spend time with the mentor in guidance.

*Prerequisite(s): Years 1, 2 + the successful passage of the USMLE STEP 1*

*Co-requisite(s): None*

*Duration: 2 or 4 weeks*

## VT/VTC Dual Enrollment Course Descriptions:

### **Research in Translational Medicine Certificate Program**

Year 01 Fall Semester

#### **RTM 5014, Introduction to Biomedical Research (6 credits)**

Concepts and elements of biomedical research, including the application of the scientific method, hypothesis generation, the biomedical research continuum (basic, translational, and clinical research), research tools, and biostatistics. Review of medical literature and components of successful interdisciplinary research. Pre: Graduate standing (6H, 6C).

Year 01 Spring Semester

#### **RTM 5024, Translational Science Applications of Biomedical Research (6 credits)**

Theory and application of the key concepts and elements of biomedical research, emphasizing the scientific method through the formulation and detailed study of biomedical research questions. Application of biostatistics concepts to an in-depth study of epidemiology and public health. Detailed consideration of biomedical research presentations, primary literature, effective collaboration and scientific misconduct in biomedical research. Pre: 5014 (6H, 6C).

Year 02 Fall Semester

#### **GRAD 5974: Independent Study (6 credits)**

Year 02 Spring Semester

#### **GRAD 5904: Project & Report (6 credits)**