



Virginia Tech Carilion
School of Medicine

VIRGINIA TECH CARILION

SCHOOL OF MEDICINE

COURSE CATALOG

2020-2021

Virginia Tech

Mission Statement

Inspired by our land-grant identity and guided by our motto, *Ut Prosim* (That I May Serve), Virginia Tech is an inclusive community of knowledge, discovery, and creativity dedicated to improving the quality of life and the human condition within the Commonwealth of Virginia and throughout the world.

2019 Mission Statement adopted by the Board of Visitors

Virginia Tech Carilion School of Medicine

Mission

To develop physician thought leaders through inquiry, research, and discovery, using an innovative curriculum based upon adult learning methods in a patient-centered context. Our graduates are physicians with outstanding clinical skills and significantly enhanced research capabilities who will remain life-long learners. They have an understanding of the importance of interprofessionalism to enable them to more effectively function as part of a modern health care team.

Accreditation Statement

Southern Association of Colleges and Schools Commission on Colleges (SACSCOC)

Virginia Polytechnic Institute and State University (Virginia Tech) is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award associate, baccalaureate, masters and doctorate degrees. Questions about the accreditation of Virginia Tech may be directed in writing to the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, GA 30033-4097, by calling (404) 679-4500, or by using information available on SACSCOC's website (www.sacscoc.org).

Course Number	Transcribed Course Title
9060	Orientation to Medical School
9061	Block I: Functional Biology Cells Tissue
9062	Block II: Human Body I
9063	Block III: Human Body II
9064	Block IV: Biology of Nervous System
9M1R	M1 Research
9071	Block V: Fundamentals of Pathobiology
9072	Block VI: Pathobiology Human Body I
9073	Block VII: Pathobiology Human Body II
9074	Block VIII: Pathobiology Human Body III
9M2IS	Independent Study
9M2R	Research

YEAR ONE

9060. 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

9061. 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 and 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: Public Health Walk, Learning in Medical School and Beyond, Introduction to Team Building, Health Care Roles and Responsibilities, Team Contracts, Team Formation, Personal Journey, Goal Setting, Teamwork Concepts, and This I Believe Statements

Prerequisite(s): 9060

Co-requisite(s): None

9062. Block II: Human Body I, Interviewing and Physical Exam II, Research, Interpersonal/Interprofessional Communication, and Roles for Collaborative Practice (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, and Habits), Vital Signs, Heart and Lungs, BMI, Vascular Ultrasound, and Longitudinal Ambulatory Care Experience (LACE)

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

Interpersonal/Interprofessional Communication and Roles for Collaborative Practice: Roles of Team Members, Communication Skills, Academic Differences and Similarities among Professions, Community Service, and Health Care Team Leadership

Prerequisite(s): 9060-9061

Co-requisite(s): None

9063. Block III: Human Body II, Interviewing and Physical Exam III, Research, Interpersonal and Interprofessional Communication, and Roles for Collaborative Practice (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 and Social History), Abdominal Exam, Male and Female Genitourinary Exams, Breast Exam, Cultural Considerations, Abdominal Ultrasound, and Longitudinal Ambulatory Care Experience (LACE)

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

Interpersonal/Interprofessional Communication and Roles for Collaborative Practice: Roles of Team Members, Communication Skills, Academic Differences and Similarities among Professions, Community Service, and Health Care Team Leadership

Prerequisite(s): 9060-9062

Co-requisite(s): None

9064. Block IV: Biology of the Nervous System, Interviewing and Physical Exam IV, Research Outcomes, Interpersonal and Interprofessional Communication, and Roles for Collaborative Practice (11 credits):

Topics for this course include:

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

Interviewing and Physical Exam IV: Patient- and Doctor-Centered Interviewing (Review of Systems), Neurological Exam, Pediatric Development, HEENT (Head, Eyes, Ears, Nose, and Throat), Dental Exam, Mental Status Exam, Normal Aging Process, and Longitudinal Ambulatory Care Experience (LACE)

Research Outcomes: Research Prospectus preparation and presentation and the Medical Scholars Series

Interpersonal/Interprofessional Communication and Roles for Collaborative Practice: Roles of Team Members, Communication Skills, Academic Differences and Similarities among Professions, Community Service, and Health Care Team Leadership

Prerequisite(s): 9060-9063

Co-requisite(s): None

9M1R. Research (3 credits):

Once a research project has been selected by the student at the end of Block IV, students are guided in their project by a research mentor and small committee of basic and clinical scientists who provide regular feedback to the students on their progress. During the M1 research course, students will complete three weeks of independent research on their chosen project.

Prerequisite(s): 9060-9064

Co-requisite(s): None

YEAR TWO

9071. Block V: Fundamentals of Pathobiology, Interviewing and Physical Exam V, Research, and Experience and Assessment of Quality and Leadership in 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, and Therapeutics

Interviewing and Physical Exam V: Clinical Skills Review (Complete History and Physical Exam); Detailed Family and Genetic History; Dermatology Exam; Ultrasound; Fundamentals of Case Presentation I; Clerkship Competency Series: Gown and Glove, Health Promotion and Disease Prevention, and Adult Immunizations; and Longitudinal Ambulatory Care Experience (LACE)

Research: Individual Student Research Project

Experience and Assessment of Quality and Leadership in Interprofessional Health Care Teams: Leadership and Team Performance, Systems Engineering in Health Care, Cognitive Biases that Influence Decision Making, On-Site Shadowing and Evaluation of Interprofessional Health Care Teams, and High-Fidelity Simulation Scenario

Prerequisite(s): 9060-9064 + 9M1R

Co-requisite(s): None

9072. Block VI: Pathobiology of the Human Body I, Interviewing and Physical Exam VI, Research, and Ethical and Legal Issues in Practice (8 credits):

Topics for this course include:

Pathobiology of the Human Body I: Hematology, Bleeding Disorders, White Cell Disorders, Vascular Diseases, Heart, Pulmonary, Ear, Nose and Throat (ENT), Lymph Nodes and Spleen, Microbiology, Virology, Pharmacology, and Therapeutics

Interviewing and Physical Exam VI: Assessing Stages of Change: Smoking Cessation, Exam Findings in Cardiopulmonary Disease, Electrocardiogram (ECG) and Chest X-ray Interpretation; Clerkship Competency Series: ABG's, Venous Blood Draws, and Oxygen Therapy; and Longitudinal Ambulatory Care Experience (LACE)

Research: Individual Student Research Project

Ethical and Legal Issues in Health Care: Ethical Principles, Model of Decision Making, Law/Practice/Codes of Ethics, Workplace Ethics Now and in the Future, Moral Courage, Autonomy/Dignity/Veracity, Distributive Justice, Beneficence, Nonmaleficence, and a Case Ethics Health Care Team Challenge

Prerequisite(s): 9071

Co-requisite(s): None

9073. Block VII: Pathobiology of the Human Body II, Interviewing and Physical Exam VII, Research, and Issues in Medicine and Culture: A Course in Medical Humanities (8 credits):

Topics for this course include:

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

Interviewing and Physical Exam VII: Fundamentals of Case Presentation II; Interview Skills: Nutrition and Supplement History, OB and Sexual History; Review: Breast Exam, GU Exams, Exam Findings in GI and Renal, History and Physical, and Psychosocial Aspects of GI, Renal, and Urogenital Diseases including Ultrasound Findings, Abnormal Breast Exam; Clerkship Competency Series: Nasogastric (NG) Tube, Foley Catheter; and Longitudinal Ambulatory Care Experience (LACE)

Research: Individual Student Research Project

Issues in Medicine and Culture – A Course in Medical Humanities: Pain, Cancer Treatment, Death, Disability and Modern Life, and Empathy

Prerequisite(s): 9071-9072

Co-requisite(s): None

9074. Block VIII: Pathobiology of the Human Body III, Interviewing and Physical Exam VIII, Research, and Public Health and Medicine (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, and Central and Peripheral Nervous Systems

Interviewing and Physical Exam VIII: History and Physical and Psychosocial Aspects of Neuromuscular Diseases; Clinical Psychiatric Syndromes and their Underlying Neurobiological Dysfunctions; Exam Findings in HEENT and Dental Diseases; Endocrine Cases including Thyroid Ultrasound; Review Pediatric Development; Clerkship Competency Series: Suturing and Wound Care; and Longitudinal Ambulatory Care Experience (LACE)

Research: Individual Student Research Project

Public Health and Medicine: Integration of Public Health and Medicine - Public Health in the 21st Century, Social Determinants of Health, Environmental Determinants of Health, Epidemiology in Action – Outbreak Investigation, The Affordable Care Act and What it Means for Practicing Physicians, and Group Presentations

Prerequisite(s): 9071-9073

Co-requisite(s): None

9M2IS. Independent Study (8 credits):

Students will complete six weeks of USMLE Step 1 preparation.

Prerequisite(s): 9071-9074

Co-requisite(s): None

9M2R. Research (11 credits):

Students will complete eight weeks of independent research.

Prerequisite(s): 9071-9074 + 9M2IS

Co-requisite(s): None

Longitudinal Student Electives

Course Number	Transcribed Course Title
9LSE	Longitudinal Student Elective

Elective time is available in Years 1 and 2 to take such courses as Foundations of Mindfulness Practice, Introduction to Medical Spanish, and Narrative Medicine – The Rest of the Story: Discovering the Person Within the Patient. These courses are offered for elective credit but are not required. Continuous registration is dependent on the student remaining in good academic standing, and the student must remain registered for the longitudinal elective during Blocks I-VII in order to earn two credits at the conclusion of Block VII.

Foundations of Mindfulness Practice (2 credits):

Mindfulness is the awareness that develops as we pay attention to our present-moment experience with acceptance, curiosity, and nonjudgment. This course will support students in establishing a mindfulness practice through both formal practices and in daily life. Class will be highly experiential, designed to explore mind-body awareness, mindfulness meditation and compassion practices, and mindful communication. The Koru Basic four-week mindfulness curriculum will be completed at the beginning of this longitudinal elective. Contemplative practices will support self-understanding to navigate life stressors with greater clarity, ease, and well-being.

Prerequisite(s): Successful completion of Block I

Co-requisite(s): None

Introduction to Medical Spanish (2 credits):

To develop communicative proficiency in medical Spanish and cultural competency for effective interactions with Spanish-speaking patients in a variety of health care settings.

Prerequisite(s): Successful completion of Block I

Co-requisite(s): None

Narrative Medicine – The Rest of the Story: Discovering the Person Within the Patient (2 credits):

This narrative medicine course seeks to develop students' attentive listening skills, empathy, reflectiveness, and narrative competence through extended patient interviews and creative response.

Prerequisite(s): Successful completion of Block I

Co-requisite(s): None

Course Number	Transcripted Course Title
9811	Clerkship - Emergency Medicine
9812	Clerkship - Family Medicine
9813	Clerkship - Internal Medicine
9814	Clerkship - Neurology
9815	Clerkship - OB-GYN
9816	Clerkship - Pediatrics
9817	Clerkship - Psychiatry
9818	Clerkship - Radiology
9819	Clerkship - Surgery
9M3R	M3 Research
9001	Step 1 Independent Study

YEAR THREE

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

- 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.
- Family Medicine (6 weeks)
- Internal Medicine (6 weeks)
- Neurology (2 weeks)
- Obstetrics and Gynecology (6 weeks)
- Pediatrics (6 weeks)
- Psychiatry (6 weeks)
- Radiology (2 weeks)
- Surgery (6 weeks)
- Research (4 weeks)

9811. Clerkship – Emergency Medicine (4 credits):

This clerkship will occur in the last portion of the third year or during the fourth 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 and initiate urgent work-ups and treatments.

Prerequisite(s): Successful completion of Years 1 & 2, 9813, 9815, 9816, 9819 and student must have taken USMLE Step 1 prior to participating in a clerkship. If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 4 weeks

9812. 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.

Prerequisite(s): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 6 weeks

9813. Clerkship – Internal Medicine (6 credits):

The third-year clerkship in Internal Medicine will occur at Carilion Roanoke Memorial Hospital. The focus will be on caring for adult hospitalized patients. The clerkship will be spent working with one of the Internal Medicine teaching teams.

Prerequisite(s): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 6 weeks

9814. Clerkship – Neurology (2 credits):

The third-year clerkship in Neurology is a two-week experience that will be divided between working with the Carilion Clinic neurologists in the inpatient setting and the neurologists at the Salem VA Medical Center in the outpatient setting. 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): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 2 weeks

9815. Clerkship – OB-GYN (6 credits):

During the OB-GYN clerkship, time will be spent on the OB and GYN services with inpatient and outpatient experiences, including a subspecialty GYN service. Students will participate in day and night labor call for OB and spend time in the operating room as part of patient care during their GYN education.

Prerequisite(s): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 6 weeks

9816. Clerkship – Pediatrics (6 credits):

The six-week Pediatric clerkship will be divided into two weeks of inpatient pediatrics at Carilion Roanoke Memorial Hospital (CRMH), one week of newborn nursery at CRMH, 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): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 6 weeks

9817. 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. All students participate in the same initial core four-week rotations, based on the Adult Inpatient Psychiatry Units and consultation–liaison service at Carilion Medical Center. Each patient will be followed by a given student from admission to discharge. During two weeks of the clerkship, the student will opt for two separate "selective" rotations of one week each.

Prerequisite(s): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 6 weeks

9818. Clerkship – Radiology (2 credits):

The third-year clerkship in Radiology is a two-week experience where students 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): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 2 weeks

9819. Clerkship – Surgery (6 credits):

The focus of this six-week Surgery clerkship is to introduce students to the care of surgical patients, including initial patient assessment and perioperative management, as well as surgical intervention itself. This rotation length will allow good continuity with the surgical team and the patients under the care of the various surgery teams.

Prerequisite(s): Successful completion of Years 1 & 2 and student must have taken USMLE Step 1 prior to participating in a clerkship.

If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 6 weeks

9M3R. Research (4 credits):

Students will complete four weeks of independent research.

Prerequisite(s): Successful completion of Years 1 & 2

Co-requisite(s): None

Duration: 4 weeks

Electives: For students not doing the Emergency Medicine clerkship during the third 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 two credits and each four-week experience counts as four credits.

9001. 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 USMLE Step 1 examination due to not achieving a target practice test score or for students who have taken and failed the USMLE 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 Senior 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 Senior Dean for Student Affairs.

Prerequisite(s): Years 1, 2

Co-prerequisite(s): None

Duration: 2, 4, or 6 weeks

Course Number	Transcripted Course Title
9811	Clerkship - Emergency Medicine
9M4R	M4 Research
9TR1	Transition to Residency I
9TR2	Transition to Residency II

YEAR FOUR

Required curricular components: (12 weeks) and Emergency Medicine (4 weeks) if not completed in Year 3

- ICU Elective – 2 weeks
 - Medical Subspecialty Elective – 2 weeks
 - Research – 2 weeks
 - Surgical Subspecialty Elective – 2 weeks
 - Transition to Residency I – 2 weeks
 - Transition to Residency II – 2 weeks
- TOTAL = 12 weeks**

- Emergency Medicine Clerkship – 4 weeks

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

Vacation: 8 weeks

9811. Clerkship – Emergency Medicine (4 credits):

This clerkship will occur in the last portion of the third year or the first half of the fourth 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's stability and initiate urgent work-ups and treatments.

Prerequisite(s): Successful completion of Years 1 & 2, 9813, 9815, 9816, 9819 and student must have taken USMLE Step 1 prior to participating in a clerkship. If a student does not successfully pass USMLE Step 1, they may not proceed to the second clerkship in which they are registered.

Co-requisite(s): None

Duration: 4 weeks

9M4R. Research (2 credits):

Students will complete two weeks of independent research.

Prerequisite(s): Successful completion of Years 1, 2 & 3 and the successful passage of the USMLE Step 1 not in every section

Co-requisite(s): None

Duration: 2 weeks

9TR1. Transition to Residency I (2 credits):

This course occurs during the two weeks surrounding the NRMP Match. Students will participate in activities in assessment of the Entrustable Professional Activities (EPAs), will celebrate Match Day, and will present posters, abstracts, and podium presentations of their VTCSOM research projects.

Prerequisite(s): Successful completion of Years 1, 2 & 3 and the successful passage of the USMLE Step 1

Duration: 2 weeks

9TR2. Transition to Residency II (2 credits):

This course occurs during the final two weeks in the four-year curriculum. Students will take the ACLS certificate course and attend sessions on various clinical topics, debt repayment and financial aid issues, residency preparation suggestions, and legal issues.

Prerequisite(s): Successful completion of Years 1, 2 & 3 and the successful passage of the USMLE Step 1

Duration: 2 weeks

ELECTIVES

Basic Science
Emergency Medicine
Family Medicine
Internal Medicine
International
Interprofessionalism
Medical Education
Neurology
Obstetrics and Gynecology
Orthopaedics
Pediatrics
Psychiatry
Radiology
Surgery
Away Elective
Independent Study
Research
Special Studies

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

Basic Science

Course Number	Transcripted Course Title
9B01	Anatomy Prosection
9B03	Forensic Pathology
9B04	Pathology

9B01. 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 the 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

9B03. 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. Students will also learn about the impact of cases on public health and safety.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 4 weeks

9B04. Elective – Pathology (2 or 4 credits):

This 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 correlating 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 + 9813, 9815, 9816, or 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

Emergency Medicine

Course Number	Transcribed Course Title
9101	Clinical Decision-Making
9102	Emergency Ultrasound
9103	Pre-Hospital Medicine
9104	Pediatric Emergency Medicine
9105	Acting Internship in Emergency Medicine
9106	Wilderness Medicine
9107	Introduction to Emergency Medicine
9108	Evidence-Based Medicine
9109	Rural Emergency Medicine
9110	A Standard in Wilderness Medicine Education

9101. 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 two-week elective will consist of several readings, discussions, and direct observation of physician decision-making in the Emergency Department setting. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 weeks

9102. Elective – Emergency Ultrasound (2 credits):

This two-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. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9103. Elective – Pre-Hospital Medicine (2 credits):

This 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 pre-hospital medicine, including capabilities, limitations, skill levels, and costs associated with pre-hospital transportation methods. Over the course of two weeks, the student will receive several hours of didactic education as well as participate in 8-10 shifts with EMS and fire units in multiple locations. The locations are Carilion Roanoke Memorial Hospital and area EMS services.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 weeks

9104. Elective – Pediatric Emergency Medicine (2 or 4 credits):

This 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.

Prerequisite(s): Years 1, 2, 9813, 9816 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9105. Elective – Acting Internship in Emergency Medicine (4 credits):

The four-week Acting Internship (AI) in Emergency Medicine elective 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 multitasking 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, pre-hospital, tactical, wilderness medicine, academic/educational development), and students are encouraged to contact us ahead of time to allow time to arrange these experiences.

Prerequisite(s): Years 1, 2, 3 + 9811

Co-requisite(s): None

Duration: 4 weeks

9106. Elective – Wilderness Medicine (2 credits):

This elective will be an immersive experience in wilderness medicine. Over the course of the two weeks, 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.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9107. Elective – Introduction to Emergency Medicine (2 credits):

The Emergency Department is a unique environment in the hospital because unselected patients with undifferentiated chief complaints arrive with no appointment. Physicians need to rapidly triage, stabilize, rule in and rule out diagnoses, and determine appropriate destination for further work-up or definitive treatment. This elective is designed for the student who is interested in emergency medicine as a career and needs earlier exposure to this field. For example, the 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

9108. 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 two-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, 3

Co-requisite(s): none

Duration: 2 weeks

9109. Elective – Rural Emergency Medicine (2 credits):

This elective will introduce the medical student to a more rural population of individuals with a wide variety of Emergency Department presentations. The student will become familiar with a different hospital system in this more rural setting. It will be expected that the medical student 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, 3 + 9811

Co-requisite(s): none

Duration: 2 weeks

9110. Elective – A Standard in Wilderness Medicine Education (4 credits):

This four-week elective is an immersive residential experience in wilderness medicine. Over the course of the four 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. Students will be eligible for Wilderness First Responder Certification at the completion of the course. The course will be taught by nationally known wilderness medicine faculty.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

Family Medicine

Course Number	Transcribed Course Title
9201	Inpatient Geriatric Medicine
9202	Nursing Home Medicine
9204	Rural Family Medicine
9205	Student Health
9206	Acting Internship in Family Medicine
9207	Functional Medicine
9208	Acting Internship in Family Medicine – Inpatient and Outpatient

9201. Elective – Inpatient Geriatric Medicine (2 or 4 credits):

The medical student will do inpatient chart review, history taking, and physical examination. From this information and based on sound geriatric principles, the medical student will develop a differential diagnosis, plan the diagnostic evaluation, and design the geriatric management of the patient. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9812

Co-requisite(s): None

Duration: 2 or 4 weeks

9202. Elective – Nursing Home Medicine (2 or 4 credits):

This elective will consist of following patients in a nursing home environment. The medical student will do the patient's chart review, history taking, and physical examination. From this information and based on sound geriatric principles, the medical student will develop a differential diagnosis, plan the diagnostic evaluation, and design the geriatric management of the patient. The location is a local nursing home.

Prerequisite(s): Years 1, 2 + 9812

Co-requisite(s): None

Duration: 2 or 4 weeks

9204. Elective – Rural Family Medicine (2 or 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

The location is an outpatient practice.

Prerequisite(s): Years 1, 2 + 9812

Co-requisite(s): None

Duration: 2 or 4 weeks

9205. 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

The location is Radford University and is available while the university is in session from August-May.

Prerequisite(s): Years 1, 2 + 9812

Co-requisite(s): None

Duration: 2 or 4 weeks

9206. 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 to understand the family physician's 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 and delivery, and 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

9207. Elective – Functional Medicine (2 credits):

This elective will consist of two weeks of consulting on patients in different clinical, exercise, and consultative settings. 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 two-week plan for lifestyle modification based upon results of an initial panel of lifestyle questionnaires and an initial evaluation of physical and nutritional fitness.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 weeks

9208. Elective – Acting Internship in Family Medicine – Inpatient and Outpatient (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, and outpatient care from a unique family medicine approach and to understand the family physician's role in the hospital and ambulatory settings. 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 and delivery, and the obstetrical wards, as these areas relate to family medicine training. The students may also work in the pediatric wards, the newborn nursery, and the intensive care unit, as these are all areas where the Family Medicine service cares for patients in the hospital. The preceptors are the attendings in the various settings. The locations are the outpatient practice and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

Internal Medicine

Course Number	Transcribed Course Title
9301	Clinical Infectious Diseases
9302	Cardiology Consults
9303	Rheumatology
9304	Physical Medicine and Rehabilitation
9306	Pulmonary Medicine
9307	Ambulatory Internal Medicine
9308	Palliative Medicine
9309	Acting Internship in Internal Medicine
9310	Acting Internship in Cardiology
9311	CCU
9312	Dermatology
9313	Gastroenterology
9314	Hematology/Oncology
9315	Medical ICU
9316	Nephrology
9317	Occupational Medicine
9318	Advanced Physical Medicine and Rehabilitation
9319	Advanced Dermatology
9320	Hospice
9321	Radiation Oncology

9301. Elective – Clinical Infectious Diseases (4 credits):

This elective will consist of consulting on patients who are hospitalized with infections. The medical student will do the patient's chart review, history taking, and physical examination. From this information, the 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 + 9813

Co-requisite(s): None

Duration: 4 weeks

9302. 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 student will perform complete reviews of the patient's electronic medical record, take an independent history, and perform a complete physical examination. From this information, the 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 student will be part of the rounding team that will include the attending, cardiology fellow, and often one or more medical residents. The 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 + 9813

Co-requisite(s): None

Duration: 2 or 4 weeks

9303. Elective – Rheumatology (2 or 4 credits):

This 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, physical examination, and documentation in EPIC. From this information, the student will develop a differential diagnosis, plan the diagnostic evaluation, and be able to outline treatments for the common mechanical, degenerative, and inflammatory musculoskeletal problems of rheumatologic diseases. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 or 4 weeks

9304. 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 students will likely see in their primary practices. The location is the Rehabilitation Unit at Carilion Roanoke Community Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 or 4 weeks

9306. Elective – Pulmonary Medicine (2 or 4 credits):

This elective consists of consulting and evaluating patients with pulmonary diseases in the inpatient and outpatient settings. The medical student will do the patient's chart review, history taking, and physical examination. From this information and the integration of physio pathological principles, the student will develop a differential diagnosis, learn how to prioritize, and propose a treatment plan. The preceptor is the inpatient attending and the locations are the outpatient office and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9813

Co-requisite(s): None

Duration: 2 or 4 weeks

9307. Elective – Ambulatory Internal Medicine (2 or 4 credits):

Students will be paired with a faculty member in Internal Medicine. 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 Carilion Clinic Riverside complex.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 or 4 weeks

9308. Elective – Palliative Medicine (2 or 4 credits):

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

Prerequisite(s): Years 1, 2 + 9813

Co-requisite(s): None

Duration: 2 or 4 weeks

9309. Elective – Acting Internship in Internal Medicine (4 credits):

The Internal Medicine Acting Internship (AI) elective 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 PGY3 resident, two PGY1 residents, and possibly one or two other medical students. The student will be assigned patients who are admitted to their team and will assume an integral role in providing care for that patient during their hospitalization. The student on the AI elective 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, 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

9310. Elective – Acting Internship in Cardiology (4 credits):

The fourth-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. He/she will also help manage an outpatient cardiology observation unit. Most patients in the 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 electrocardiogram (ECG) and imaging aspects of the study. Patients with heart failure will be investigated for etiology of HF exacerbation and 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, mid-level provider, and resident. 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

9311. Elective – CCU (2 or 4 credits):

The Coronary Care Unit (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 elective occurs in the

CCU of Carilion 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 preceptor is the CCU faculty attending.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9312. Elective – Dermatology (2 or 4 credits):

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 locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 9813 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9313. Elective – Gastroenterology (2 or 4 credits):

Students will be exposed to a wide array of common and unusual gastrointestinal conditions. Additionally, students will attend procedures in the endoscopy suite. They will review the patient's chart, obtain a pertinent history, and perform an appropriate physical examination. In consultation with the attending, students will develop a differential diagnosis, plan the diagnostic evaluation, and design management options for the patient's gastrointestinal disease. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9314. Elective – Hematology/Oncology (2 or 4 credits):

This elective will consist of working primarily in the outpatient setting in conjunction with the faculty hematologist/oncologist. The medical student will do the patient's chart review, history taking, and physical examination. From this information, the student will develop a differential diagnosis, plan the diagnostic evaluation, and discuss the patient's management options with the attending. The location is Blue Ridge Cancer Care.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9315. 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 Intensive Care Unit attending and the location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9316. Elective – Nephrology (2 or 4 credits):

This 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

such as hypertension (HTN). The preceptor is the attending of record from Valley Nephrology and the location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9317. 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 well-being 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 will consist of seeing patients in the Carilion Clinic Occupational Medicine Clinic.

Prerequisite(s): Years 1, 2 + 9813

Co-requisite(s): None

Duration: 2 weeks

9318. Elective – Advanced Physical Medicine and Rehabilitation (2 credits):

In this elective, the student 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 student will likely see in their primary practice. On the Advanced Physical Medicine and Rehabilitation 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&R elective that is indicative of their prior experience in a PM&R setting. The location is the Rehabilitation Unit at Carilion Roanoke Community Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9319. Elective – Advanced Dermatology (4 credits):

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 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 elective and will be expected to be more involved in the management of procedures in the office setting. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3 + 9312

Co-requisite(s): None

Duration: 4 weeks

9320. Elective – Hospice (2 credits):

Students will make home visits with home health nurses, a physician, and a nurse practitioner. They will attend the interdisciplinary team rounds on Thursday mornings and will learn the regulations around eligibility for hospice services.

Prerequisite(s): Years 1, 2 + 9813

Co-requisite(s): None

Duration: 2 weeks

9321. 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 location is Blue Ridge Cancer Care.

Prerequisite(s): Years 1, 2 + 9818

Co-requisite(s): None

Duration: 2 or 4 weeks

International

Course Number	Transcribed Course Title
9G02	Global Health – Mungeli, India
9G03	Global Health – Kazan, Russia, Kazan State Medical University
9G04	Global Health – Saint-Lô, France, The Memorial Hospital of Saint-Lô
9G05	Global Health – Wonju, South Korea, Yonsei University Wonju College of Medicine
9G06	Global Health - Pop Wuj, Guatemala
9G07	Global Health – Florianópolis, Brazil, University of Southern Catarina
9G08	Global Health – Rio de Janeiro, Brazil, Berkeley Institute for Simulation
9G09	Global Health – New Taipei City, Taiwan, MacKay Memorial Hospital
9G10	Global Health – Kaohsiung City, Taiwan, E-Da Hospital/I-Shou University
9G11	Global Health – Taiwan, E-Da Hospital/I-Shou University/MacKay Memorial Hospital
9G12	Global Health – Trujillo, Peru, Medical Electives Network
9G13	Global Health – Wrocław, Poland, Wrocław Medical University

9G02. Elective – Global Health – Mungeli, India (4 credits):

The purpose of this 4-week elective is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with health care in Mungeli, Chhattisgarh. Founded in 1897, Christian Hospital Mungeli (CHM) is a 120-bed hospital that provides a broad spectrum of modern medical services to the people of Mungeli, Chhattisgarh and the surrounding districts. CHM also operates a nursing school and administers the 600-student Rambo Memorial English Medium School.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G03. Elective – Global Health – Kazan, Russia, Kazan State Medical University (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with health care in Kazan. The student will have an opportunity to participate in the longitudinal care of patients, review images and lab studies, and learn and practice basic surgical techniques. There will also be the opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education 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: 4 weeks

9G04. Elective – Global Health – Saint-Lô, France, The Memorial Hospital of Saint-Lô (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with health care 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 the city during the D-Day invasion. The student may have the opportunity to rotate through general medical units or specific subspecialty practices. The student is 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, and learn and practice basic surgical techniques. There will also be the opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education in the culture of France.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G05. Elective – Global Health – Wonju, South Korea, Yonsei University Wonju College of Medicine (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinics and to get acquainted with health care in Wonju, South Korea. Composed of a pre-medical 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, and learn and practice basic surgical techniques. There will also be the opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education 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: 4 weeks

9G06. Elective – Global Health – Pop Wuj, Guatemala (2 or 4 credits):

The purpose of this elective is to allow the student to broaden their medical knowledge through intensive one-to-one Spanish instruction in Guatemala. Since June 2002, Pop Wuj has offered a Medical Spanish Program for medical students, providers, public health professionals, and other health care practitioners which provides health and medical education as well as clinical experience in Guatemala. One of the most important goals of this program is to increase students' cultural competency in addition to their Spanish language skills. To deliver health care in a compassionate way, with the knowledge of the culture and history of the population one works with, is an essential value to Pop Wuj's vision of the Medical Spanish Program.

Prerequisite(s): Years 1, 2, 3 + must have some Spanish language proficiency

Co-requisite(s): None

Duration: 2 or 4 weeks

9G07. Elective – Global Health, Brazil, Florianópolis, University of Southern Catarina (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing and/or assisting doctors and other health care professionals in outpatient and inpatient settings in Brazil. This elective will also provide an opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education in the culture of Brazil. It is expected that students will spend 3-4 weeks with the University of Southern Catarina (UNISUL) located in Santa Catarina state, which includes Florianópolis, a sister city of Roanoke. The course will be tailored to the student's needs, but offers a great opportunity to explore

health care disparities and funding in challenging times within the Brazilian health care system. More information can be found at: www.unisul.br.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G08. Elective – Global Health – Rio de Janeiro, Brazil, Berkeley Institute for Simulation (2 credits):

The purpose of this two-week elective is to allow the student to broaden their medical knowledge through observing and/or assisting doctors and other health care professionals in simulation trainings and curriculum design for interprofessional health care professionals from throughout Brazil. This elective will also provide an opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, systems of health care, and medical education in the culture of Brazil. The elective can be done in conjunction with the four-week elective for Florianópolis, Brazil.

The two-week elective in Rio de Janeiro involves working and observing at the Berkeley Institute for Simulation. This center provides health care simulation to a variety of professionals and students involved in EMS and the provision of health services. This elective would be tailored based on dates and curricular schedule at the center. In addition, there is a company, IBKL, associated with the institute that health care companies engage with to meet their individual academic needs through simulation modules. The VTCSOM student will have an opportunity to observe the business side of simulation centers as well as the academic delivery of simulations to various health care professionals throughout Brazil. More information can be found at: www.berkeley.com.br or www.ibkl.com.br

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9G09. Elective – Global Health – New Taipei City, Taiwan, MacKay Memorial Hospital (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing and/or assisting doctors and other health care professionals in outpatient and inpatient settings in Taiwan. This elective will also provide an opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education in the culture of Taiwan. It is expected that students will spend four weeks within various clinical rotations at MacKay Memorial Hospital or a nearby affiliate. These hospitals and clinics are part of the MacKay Medical College system. The course will be tailored to the student's needs and offers a variety of clinical experiences in an urban and unique cultural setting. More information can be found at:

<http://eng.mmh.org.tw/dnn>.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G10. Elective – Global Health – Kaohsiung City, Taiwan, E-Da Hospital/I-Shou University (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing and/or assisting doctors and other health care professionals in outpatient and inpatient settings in Taiwan. This elective will also provide an opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education in the culture of Taiwan. It is expected that students will spend four weeks with E-Da Hospital/I-Shou University located in Kaohsiung City, Taiwan. The course will be tailored to the students' needs and enable them to explore a vibrant and integrated Chinese Medical School and Clinic on site at E-Da Hospital. It also offers the unique opportunity to simultaneously complete a four-week course in traditional Chinese medicine at the School of Chinese Medicine, I-Shou University, developed by Professor Tsai, Head of the Department of

Chinese Medicine of E-Da Hospital and Honorable Consultant, I-Shou University. More information can be found at: <http://www.edah.org.tw/english/about.asp> and <http://www.isu.edu.tw/en1/>.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G11. Elective – Global Health – Taiwan, E-Da Hospital/I-Shou University/MacKay Memorial Hospital (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing and/or assisting doctors and other health care professionals at two locations in Taiwan (Kaohsiung and Taipei/New Taipei). This elective will also provide an opportunity to learn about global health, health care disparities, global development, cultural exchanges, international affairs, and medical education in the culture of Taiwan.

It is expected that students will spend two weeks with E-Da Hospital/I-Shou University located in Kaohsiung City, Taiwan. The course will be tailored to the students' needs and enable them to explore a vibrant and integrated Chinese Medical School and Clinic on site at E-Da Hospital. More information can be found at:

<http://www.edah.org.tw/english/about.asp> and <http://www.isu.edu.tw/en1/>.

It is expected that students will spend two weeks within various clinical rotations at MacKay Memorial Hospital or a nearby affiliate. These hospitals and clinics are part of the MacKay Medical College system. The course will be tailored to the student's needs and offers a variety of clinical experiences in an urban and unique cultural setting. More information can be found at: <http://eng.mmh.org.tw/dnn>.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G12. Elective – Global Health – Trujillo, Peru, Medical Electives Network (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through intensive one-to-one Spanish instruction in Peru. Since 2011, Medical Electives Network has offered medical electives, including a CME-accredited Medical Spanish Program, in Trujillo and other sites around Peru. The Medical Electives Network was established to provide health and medical education as well as health care Spanish skills in Peru. Elective rotations take place at both government hospitals and non-governmental organizations (NGO) facilities. Conditions at the hospitals vary according to the resources available. Students will experience health care in a developing country and see conditions they may not see in the United States.

In addition to their clinical work, students will develop their general and medical Spanish skills. Classes are taught at all levels, and beginner Spanish speakers have the option of taking an intensive Medical Spanish Program, which offers an additional two hours each morning for the first week or two before beginning the clinical rotation. This provides an opportunity to build language skills before beginning clinic.

The Medical Electives Network program also provides 2-3 community health fairs per month where students will spend the day in a public location helping provide free consultations and medical treatment to patients. Community partners for these events include local municipalities, the national police, and the prison service. Other outreach opportunities include week-long surgical missions (2-3 per year) and volunteering at an orphanage or senior program. More information can be found at: <https://medical-electives.net/>

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9G13. Elective – Global Health – Wrocław, Poland, Wrocław Medical University (4 credits):

The purpose of this four-week elective is to allow the student to broaden their medical knowledge through observing or/and assisting doctors in clinical rotations at Wrocław Medical University while gaining an enhanced understanding of health care in Poland.

The Wrocław Medical University is one of the most renowned public medical schools in Poland. There are two clinical hospitals: The Individual Public Clinical Hospital and the University Clinical Hospital. Both have the best quality equipment at their disposal, which allows them to conduct diagnostics and treatment at the highest level. Furthermore, the university oversees the Academic Stomatology Policlinic and the Alzheimer's Centre in Scinawa. The total number of chairs and clinics amounts to 164. Altogether, 1,093 academic professors and teachers work at the university, which currently educates nearly 6,000 students in 10 fields: Medicine, Medicine and Dentistry, Pharmacy, Medical Analysis, Dietetics, Emergency Medicine, Physiotherapy, Nursing, Obstetrics, and Public Health.

Wrocław Medical University has 39 international agreements of cooperation signed with other universities abroad. There is a wide exchange of students and teaching staff within the framework of the Socrates/Erasmus program of the European Union, especially with France, Germany, Italy, Sweden, Spain, the Netherlands, and England.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

Interprofessionalism

Course Number	Transcribed Course Title
9P01	Clinical Quality
9P02	Medical Spanish

9P01. Elective – Clinical Quality (2 credits):

The purpose of this elective is to provide an introduction to the fundamentals of efforts to ensure the quality and safety of clinical care provided in an inpatient setting. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9P02. Elective – Medical Spanish (2 credits):

Students will learn the Spanish language as used in the clinical setting. This elective is mostly non-clinical and will be in a classroom setting. There will be opportunities to enter the clinical setting with an interpreter. The location is Virginia Tech Carilion School of Medicine.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

Medical Education

Course Number	Transcribed Course Title
9M01	Medical Education

9M01. 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

Course Number	Transcribed Course Title
9401	Vascular Neurology
9402	Inpatient Consults
9403	Outpatient Neurology
9404	Acting Internship in Neurology

9401. Elective – Vascular Neurology (2 credits):

Stroke accounts for more than half 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. This location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 weeks

9402. 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, emergency medicine, 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 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 location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 weeks

9403. 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, electromyography (EMG) and neuromuscular disease, among 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 location is Carilion Clinic Riverside complex.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 weeks

9404. Elective – Acting Internship in Neurology (4 credits):

This elective is designed for fourth-year medical students with a strong interest in neurology who intend to pursue residency training in neurology (or a related discipline including, but not limited to, Neurosurgery or Psychiatry). The goal of this elective is to give students an opportunity to take an active role on the neurology team in both inpatient and outpatient settings. Emphasis will be placed on improving skills in taking a thorough and relevant history, performing complete, as well as problem-focused neurological examinations, ordering diagnostics, and formulating treatment plans. Students may also assist residents or attending physicians in procedures as appropriate. Students will rotate for

two weeks on the inpatient consult service to gain experience with a wide breadth of neurological diseases. Students will also spend a week on the stroke team to increase depth of knowledge in vascular neurology and a week in the outpatient clinic to develop experience with multiple sclerosis, headache, movement disorders, neuromuscular diseases, and epilepsy. Depending on the student's interests and availability of resources, experience in the Epilepsy Monitoring Unit may be arranged. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

Obstetrics and Gynecology

Course Number	Transcribed Course Title
9501	Reproductive Endocrinology and Infertility
9502	Urogynecology
9503	Acting Internship in Gynecologic Oncology
9504	Acting Internship in Maternal Fetal Medicine
9505	OB-GYN Boot Camp
9506	OB-GYN New River Valley

9501. 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 elective 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. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9502. Elective - Urogynecology (2 or 4 credits):

This elective is designed for a student interested in obstetrics and gynecology or primary care with a strong emphasis on women's health or a surgical subspecialty. This elective 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 post-operative patients during their hospital stay. Students will also participate in Friday morning didactics with the residents. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9503. 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. The student will observe and assist with surgical cases including robotic cases. The student will gain an understanding of post-operative 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 fourth-year student will participate in the same didactic curriculum with the residents. There is no on-call responsibility, but the student will be expected to participate in inpatient rounds during two of the four Saturdays. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9504. Elective – Acting Internship in 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 genetic counseling sessions, ultrasounds, maternal fetal medicine consults, and prenatal visits. The student will interact with the attendings, 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 elective (not performing vaginal deliveries or cesarean deliveries). The locations are the outpatient office and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9505. 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

9506. Elective – OB-GYN New River Valley (4 credits):

This elective is designed to provide an opportunity for the student to gain experience in ambulatory and hospital settings 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 woman care. Students will be involved in the pre-operative, surgical, and post-operative 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 and 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. The locations are the outpatient office and Carilion New River Valley Medical Center.

Prerequisite(s): Years 1, 2 + first half of year 3 + 9819

Co-requisite(s): None

Duration: 4 weeks

Orthopaedics

Course Number	Transcribed Course Title
9910	Orthopaedics - 3rd Year
9911	Orthopaedics A, Specialty
9912	Orthopaedics B, Non-Specialty
9913	Orthopaedics, ER
9914	Pediatric Orthopaedic Surgery

9910. Elective - Orthopaedics 3rd 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/musculoskeletal (MSK) will include operating room exposure at least one day 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 post-operative management. Exposure to anesthesia principles and acute care pain management are also components of this elective. The preceptor is an orthopaedic faculty member and the locations are the orthopaedic outpatient facilities and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 or 4 weeks

9911. Elective - Orthopaedics A, Specialty (2 or 4 credits):

This elective is designed for those students considering a career in orthopaedic surgery. It is available from July-December only and priority is given to students who have completed a MS3 orthopaedic elective. It is designed to allow increased exposure to orthopaedic subspecialties and/or one-on-one faculty interaction, if requested and mutually agreeable to student and faculty. Each 2- or 4-week block will have students assigned to a cross section of faculty and with one week of one-on-one faculty interaction, if requested. Students will follow the attending schedule (including on-call when applicable). ALL rotations include a mandatory one-week trauma/fracture service rotation. Students may select a one-week specific subspecialty rotation or they may be assigned to a number of providers to broaden the subspecialty exposure. The option of a one-week rotation will be offered only to students who have done a four-week MS3 orthopaedic elective. The preceptor is an orthopaedic faculty member and the locations are the orthopaedic outpatient facilities, Carilion Roanoke Memorial Hospital, Carilion Roanoke Community Hospital and Roanoke Ambulatory Surgery Center.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9912. Elective – Orthopaedics B, Non-Specialty (2 or 4 credits):

This elective 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 2- or 4-week block is divided into rotations with students assigned to a subspecialty for each week when possible. Students will be assigned to faculty and office or operating room on a day-by-day schedule. While there are no mandatory rotations, time on the trauma/fracture service rotation is advised. Students may select specific subspecialty rotation(s) and every effort will be made to honor requests. Rotation selection and one-week options are dependent on faculty availability and coordination with MS3 rotations. The preceptor is an orthopaedic faculty member

and the locations are the orthopaedic outpatient facilities, Carilion Roanoke Memorial Hospital and Carilion Roanoke Community Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 or 4 weeks

9913. Elective – Orthopaedics, ER (2 or 4 credits):

This 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. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, + 9813, 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9914. Elective – Pediatric Orthopaedic Surgery (2 credits):

This elective will expose students to common pediatric musculoskeletal pathologies including plicas, bone and soft tissue cysts, pes planus (flat foot), developmental dysplasia of the hip, tendon contractures, and more. Students will spend time in the clinic and operating room working alongside a fellowship-trained pediatric orthopaedic surgeon. Students will have an opportunity to strengthen their history taking and physical exam skills, as well as their orthopaedic fund of knowledge. Students will be allowed to attend surgeries with the expectation that they have a strong knowledge of the patient's history and the procedure they are undergoing. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

Pediatrics

Course Number	Transcribed Course Title
9601	Pediatric Endocrinology
9602	Pediatric Cardiology
9603	Pediatric Pulmonary/Allergy
9604	Pediatric Gastroenterology
9605	Acting Internship in Pediatrics
9606	Community Pediatrics
9607	Developmental Pediatrics
9608	Genetics and Genetic Testing
9610	Neonatal ICU
9611	Pediatric Hematology/Oncology
9612	Pediatric ICU
9613	Pediatric Neurology
9614	Genetics/Pediatric Developmental Disorders

9601. Elective - Pediatric Endocrinology (2 or 4 credits):

This 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 locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): **Years 1, 2 + 9816**

Co-requisite(s): None

Duration: 2 or 4 weeks

9602. Elective - Pediatric Cardiology (2 or 4 credits):

The mission of this elective is to provide an in-depth learning experience in the field of non-invasive pediatric cardiology. Emphasis will be placed on outpatient management of children with heart disease. Students will be participating in non-invasive testing for heart disease including electrocardiography (ECG), echocardiography, fetal echocardiography, and stress testing. Students 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. Students will develop clinical skills in cardiac auscultation and interpretation of pediatric ECGs. Students will attend teaching and patient care conferences. The locations are the outpatient clinics and Carilion Roanoke Memorial Hospital.

Prerequisite(s): **Years 1, 2 + 9816**

Co-requisite(s): None

Duration: 2 or 4 weeks

9603. Elective - Pediatric Pulmonary/Allergy (2 or 4 credits):

Students will rotate in the inpatient ward, the pediatric intensive care unit (PICU), the neonatal intensive care unit (NICU), and the outpatient clinics, as well as experience the bronchoscopy lab and pulmonary function testing (PFT) lab. Rotations will include rounding with the physicians in these areas. In some instances, students will examine patients, perform physical examinations, and develop a 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 locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9816

Co-requisite(s): None

Duration: 2 or 4 weeks

9604. Elective - Pediatric Gastroenterology (2 or 4 credits):

This elective is intended to develop the medical students' clinical skills and enhance their fund of knowledge in the evaluation and management of inpatient and outpatient gastroenterology (GI), hepatology, and nutrition disorders. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9816

Co-requisite(s): None

Duration: 2 or 4 weeks

9605. Elective - Acting Internship in Pediatrics (4 credits):

This 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 student will take the history and perform the physical examination at the time of admission. From this information, the student will develop a differential diagnosis, plan the diagnostic evaluation, and design the management of the patient. The 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 (PGY2, PGY3) resident and the pediatric attending physician. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9606. Elective - Community Pediatrics (2 or 4 credits):

The mission of this elective 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. Students will learn about pediatric growth and development, perform and document history and physicals on well and sick children, provide age specific anticipatory guidance for pediatric patients and their families, and manage the care of sick infants and children over serial office visits to promote and understand continuity of care, including the evaluation, diagnosis, and treatment of common acute pediatric diseases. The location is the outpatient clinic.

Prerequisite(s): Years 1, 2 + 9816

Co-requisite(s): None

Duration: 2 or 4 weeks

9607. Elective - Developmental Pediatrics (2 credits):

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

Prerequisite(s): Years 1, 2 + 9813, 9815, 9816

Co-requisite(s): None

Duration: 2 weeks

9608. Elective - Genetics and Genetic Testing (2 or 4 credits):

This 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 student will generate a differential diagnosis, plan the diagnostic evaluation, and create a management plan in consultation with the attending physician. The location is the outpatient clinic.

Prerequisite(s): Years 1, 2 + 9813, 9815, 9816

Co-requisite(s): None

Duration: 2 or 4 weeks

9610. Elective - Neonatal ICU (2 or 4 credits):

The general objectives of this elective are to obtain a broad understanding of the medical problems afflicting infants during the first month of life and to learn generally applicable principles in the neonatal intensive care unit (NICU) setting. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9611. Elective - Pediatric Hematology/Oncology (2 or 4 credits):

This 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 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 locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9816

Co-requisite(s): None

Duration: 2 or 4 weeks

9612. Elective - Pediatric ICU (2 or 4 credits):

The student will spend the elective time in the intensive care unit (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 location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9613. Elective - Pediatric Neurology (2 or 4 credits):

This 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 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 locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9816

Co-requisite(s): None

Duration: 2 or 4 weeks

9614. Elective – Genetics/Pediatric Developmental Disorders (4 credits):

This elective will introduce the medical student to the evaluation and management of special needs children. The elective consists of alternating rotations with the outpatient Child Development Clinic and Pediatric Genetics Clinic, as well as inpatient pediatric genetic consults. The student will do the patient's chart review, history taking, and physical examination. From this information, the student will generate a differential diagnosis, plan the diagnostic evaluation, and create a management plan.

Prerequisite(s): Years 1, 2 + 9813, 9815, 9816

Co-requisite(s): None

Duration: 4 weeks

Psychiatry

Course Number	Transcribed Course Title
9701	Child and Adolescent Psychiatry - Outpatient
9702	Child and Adolescent Psychiatry - Inpatient
9703	Consultation Liaison Psychiatry
9704	Geriatric Psychiatry
9705	Acting Internship in Psychiatry
9706	Acting Internship in Psychiatry, Catawba
9707	Inpatient Psychiatry, Catawba
9708	Acting Internship in Psychiatry, Veterans Affairs Medical Center
9709	Advanced Outpatient Child and Adolescent Psychiatry

9701. Elective - Child and Adolescent Psychiatry- Outpatient (2 or 4 credits):

This elective 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. Students will be able to observe psychotherapy and pharmacotherapy with the pre-adult patient and learn about the importance of family interactions. The location is Carilion Roanoke Memorial Hospital, Rehabilitation Center.

Prerequisite(s): Years 1, 2 + 9817

Co-requisite(s): None

Duration: 2 or 4 weeks

9702. Elective - Child and Adolescent Psychiatry- Inpatient (2 or 4 credits):

This elective is based in 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 in group and individual settings. 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 psychotherapy and pharmacotherapy with the pre-adult patient and learn about the importance of family interactions. The location is Carilion Roanoke Memorial Hospital, Rehabilitation Center.

Prerequisite(s): Years 1, 2 + 9817

Co-requisite(s): None

Duration: 2 or 4 weeks

9703. Elective - Consultation Liaison Psychiatry (2 or 4 credits):

This elective will focus on patients in medical, surgical, and rehabilitation units who are in need of psychiatric care and are seen under the supervision of a board-certified psychosomatic psychiatrist. Ages of this population are 18 and older. 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. A first- or second-year psychiatry resident may also be involved in the teaching. The student will be able to observe how the psychiatrist can usefully

contribute to the care of medically or surgically hospitalized individuals. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9817

Co-requisite(s): None

Duration: 2 or 4 weeks

9704. Elective - Geriatric Psychiatry (2 or 4 credits):

During this elective, the student will participate in a wide spectrum of treatments used 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 at 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 age range of the patients treated is 65 and older. 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 psychotherapy and pharmacotherapy with the geriatric patient and learn about the the importance of family support, variations in physiology and metabolism in the aging individual, and end-of-life issues. The locations are the outpatient office and nursing homes in the Roanoke Valley.

Prerequisite(s): Years 1, 2 + 9817

Co-requisite(s): None

Duration: 2 or 4 weeks

9705. Elective - Acting Internship in Psychiatry (4 credits):

During this elective, the student will work with the assigned attending, resident, and students as an active member of the treatment team on the inpatient psychiatry units. The student will be assigned a maximum of six patients and will be an active team leader on the treatment team under the supervision of the resident and attending physicians. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9706. Elective – Acting Internship in Psychiatry, Catawba (4 credits):

During this elective, the student will work with the assigned attending, resident, and students as an active member of the treatment team on the inpatient psychiatry units at Catawba Hospital. The student will be assigned a maximum of six patients and 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

9707. Elective – Inpatient Psychiatry, Catawba (2 credits):

During this elective, the student will work with the assigned attending, resident, and students as an active member of the treatment team on the inpatient psychiatry units at Catawba Hospital. The student will be assigned a maximum of six patients and 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

9708. Elective – Acting Internship in Psychiatry, Veterans Affairs Medical Center (4 credits):

During this elective, the student will work with the assigned attending and resident as an active member of the treatment team on the inpatient psychiatry units. The student will be assigned a maximum of six patients and will be an

active team leader on the treatment team under the supervision of the resident and attending physicians. Duties will include leading daily treatment team meetings in discussion of patients, writing notes, making recommendations for the treatment plan, reviewing labs and imaging results, and communicating with consultants. The location is the Veterans Affairs Medical Center.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9709. Elective – Advanced Outpatient Child and Adolescent Psychiatry (2 or 4 credits):

This elective will allow students who have previously completed outpatient child and adolescent psychiatry to experience community psychiatry services offered in the Roanoke Valley in addition to participating in standard outpatient clinics. Students will have the opportunity to work in the community with Carilion providers and experience multiple psychiatric services that are unavailable during the introductory outpatient/inpatient child and adolescent psychiatry rotation. Each student will have the opportunity to customize their learning experience based on individual interests and learning goals. During this rotation, students will be encouraged to take additional responsibility in patient management with emphasis placed on initial diagnosis, pharmacological treatment, and patient disposition following each encounter. At the conclusion of the rotation, students who choose the four-week option are expected to do a 5-10 minute presentation on a topic of personal interest related to child and adolescent psychiatry. Locations include Pediatric Neurodevelopment Clinic, Community Teen Clinic, Intercept Youth Services, and Roanoke City Department of Social Services.

Prerequisite(s): 9071, 9817

Co-requisite(s): None

Duration: 2 or 4 weeks

Radiology

Course Number	Transcribed Course Title
9801	Interventional Radiology
9802	Breast Imaging
9803	Musculoskeletal Radiology
9804	Neuroradiology
9805	Advanced Interventional Radiology
9806	Acting Internship in Interventional Radiology

9801. Elective - Interventional Radiology (2 credits):

This 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. Students will be exposed to daily teaching sessions with interventional radiologists and attend multidisciplinary conferences that incorporate patient management issues. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9818

Co-requisite(s): None

Duration: 2 weeks

9802. Elective - Breast Imaging (2 credits):

This 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. Students will be exposed to daily teaching sessions and attend multidisciplinary conferences that incorporate patient management issues. The location is the Carilion Breast Care Center.

Prerequisite(s): Years 1, 2 + 9818

Co-requisite(s): None

Duration: 2 weeks

9803. Elective - Musculoskeletal Radiology (2 credits):

This elective will consist of further clinical experience in the subspecialty of musculoskeletal radiology to include the modalities of computed tomography (CT), magnetic resonance imaging (MRI), and arthrography in the imaging diagnosis of musculoskeletal diseases. Students will be exposed to daily teaching sessions with radiologists and attend multidisciplinary conferences that incorporate patient management issues. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9818

Co-requisite(s): None

Duration: 2 weeks

9804. Elective - Neuroradiology (2 credits):

This two-week elective is for the student with an interest in pursuing a residency in the neurosciences or a 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 database. 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 location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9818

Co-requisite(s): None

Duration: 2 weeks

9805. Elective – Advanced Interventional Radiology (2 or 4 credits):

This two-week elective will allow students who have previously completed the interventional radiology elective to learn more advanced aspects 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 arteriovenous malformations (AVM). Students will also observe and gain knowledge in radiofrequency ablation and catheter-directed therapies. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3 + 9801

Co-requisite(s): None

Duration: 2 or 4 weeks

9806. Elective – Acting Internship in Interventional Radiology (4 credits):

This four-week elective is designed for students applying to residency in interventional radiology. The AI is intended to give the prospective IR applicant an understanding of what a rotation will be like in residency. The focus will be on understanding management and appropriateness of procedures rather than simply being exposed to the types of procedure IR performs. Students will develop procedural skills, including ultrasound guidance with paracentesis, thoracentesis, and vascular access. Students will be expected to perform at least eight jugular venous accesses with ultrasound guidance, five paracenteses, and prepare the list of procedures for rounds each morning. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3 + 9801

Co-requisite(s): None

Duration: 4 weeks

Surgery

Course Number	Transcripted Course Title
9901	Neurosurgery Spine Track
9902	Neurosurgery Pediatrics Track
9903	Neurosurgery ICU Track
9904	Neurosurgery Operating Room Track
9905	Neurosurgery Research Track
9906	Neurosurgery Consultation Track
9907	Acting Internship in Neurosurgery
9920	Anesthesia
9921	Advanced Anesthesiology
9923	General Surgery/Trauma Night Float
9924	Acting Internship in Surgical ICU
9925	Urology
9927	Wound Care
9928	Breast Surgery
9929	Acute Care Skills Certificate
9930	Cardiothoracic Surgery
9931	Oral Health
9932	CNRV General Surgery
9933	Pediatric Otolaryngology/ENT
9934	Acting Internship in Emergency General Surgery
9936	Otolaryngology, Head & Neck Surgery-ENT
9937	Pain Management
9938	Surgical Readiness
9939	Ophthalmology
9941	Pediatric Surgery
9942	Plastic Surgery
9943	Surgical ICU
9944	Trauma Surgery
9945	Roanoke Vascular

9901. Elective - Neurosurgery Spine Track (2 or 4 credits):

Students on this elective will experience about 40% of the week in the Neurosurgery and/or Spine Center Clinic and 60% in the operating room and inpatient floors. Students 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 locations are the Institute for Orthopaedics and Neurosciences and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9902. Elective - Neurosurgery Pediatrics Track (2 or 4 credits):

In this elective, students will work closely with two pediatric neurosurgery attending surgeons. 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 locations are the Institute for Orthopaedics and Neurosciences and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9903. Elective - Neurosurgery ICU Track (2 or 4 credits):

In this track, 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 intensive care unit (ICU) setting once the acute situation has been initially identified and evaluated. The preceptor is the neurosurgery faculty and the location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9904. Elective - Neurosurgery Operating Room Track (2 or 4 credits):

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 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9905. Elective - Neurosurgery Research Track (2 or 4 credits):

Students on the research track work predominately on ongoing 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, and 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 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9906. 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 locations are the Institute for Orthopaedics and Neurosciences and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9907. Elective - Acting Internship in Neurosurgery (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 inpatients with whom they care for and follow throughout the patients' hospitalizations. They will spend a sizable amount of time in the intensive care units (ICUs), 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 location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3 + neurosurgical elective

Co-requisite(s): None

Duration: 4 weeks

9920. Elective - Anesthesia (2 or 4 credits):

The goal of the elective is to provide the medical student "hands on" exposure to the field of anesthesia and anesthesiology and can be taken by a third- or fourth-year student. The student 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, the student 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. The student will have participated with anesthesiologist preceptors in placement of monitors and conduction of anesthetics, including induction, intubation, maintenance, emergence, extubation, and post-anesthetic recovery care. The student 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

9921. Elective - Advanced Anesthesiology (2 or 4 credits):

The goal of the elective is to provide the medical student "hands on" exposure to the field of anesthesia and anesthesiology and builds upon knowledge of the third year. The student 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, the student should have a basic understanding of the principles of pre-anesthetic evaluation, preparation, and anesthetic care, including history, preceptors in placement of monitors, and conduction of anesthetics, including induction, intubation, maintenance, emergence, extubation and post-anesthetic recovery care. The student 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 + 9920

Co-requisite(s): None

Duration: 2 or 4 weeks

9923. Elective – General Surgery/Trauma Night Float (2 credits):

The purpose of this two-week elective is to allow the student to work with the general surgery/trauma services team which handles surgical intervention and perioperative patient care. The student will gain patient care skills and time management skills to offer quality care while managing multiple aspects of patient care. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9924. Elective – Acting Internship in Surgical ICU (4 credits):

During this elective, the student is expected to participate in daily rounds in the intensive care unit (ICU) and function as a sub-intern. The student will present assigned patients on rounds, attend all lectures and conferences, and read required material. The student will also have the opportunity to do procedures under close supervision. There may be night and weekend call, and on-duty hours will follow resident duty hours. Nighttime duties should be expected. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9925. Elective – Urology (2 or 4 credits):

This elective will consist of working both in the outpatient and inpatient settings in conjunction with the faculty urologists. In the outpatient setting, the student will do the patient's chart review, history taking, and physical examination. From this information, the 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. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2

Co-requisite(s): None

Duration: 2 or 4 weeks

9927. Elective – Wound Care (2 or 4 credits):

The purpose of this elective is for students to gain familiarity with the causes of chronic wounds, principles of wound healing, and advanced wound management techniques. Students will gain broad exposure to the field of wound care through a busy multidisciplinary wound care service. This should be particularly useful for students interested in any specialty, from primary care to surgical subspecialties. This will be a "hands on" rotation with bedside interventions involved in the care of most patients, as well as involvement in a uniquely interdisciplinary service. The locations are Carilion Clinic Wound Center and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): none

Duration: 2 or 4 weeks

9928. Elective - Breast Surgery (2 credits):

This two-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 the rotation is spent gaining experience on the plastic and reconstructive aspect of breast patient care. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9929. Elective – Acute Care Skills Certificate (2 credits):

This elective consists of intensive training to prepare graduating medical students for their residencies. Over the course of the rotation, students will obtain certification in Advanced Trauma Life Saving (ATLS), Pediatric Advanced Life Saving (PALS), and Fundamental Critical Care Support (FCCS). If time and interest allow, students will also obtain Basic Disaster Life Support (BDLS) training and certification. The location is Carilion Clinic Riverside complex.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): none

Duration: 2 weeks

9930. Elective - Cardiothoracic Surgery (2 or 4 credits):

During this elective, the student will gain experience in operative and perioperative management of cardiac and thoracic surgical problems. This includes illnesses of the esophagus, motility disorders, Boerhaave Syndrome, hiatal hernias, reflux disease, infections, benign neoplastic masses, malignancies, mediastinal masses, lung masses, aortic dissections, and trauma. The student will also learn about surgical approaches. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9931. Elective – Oral Health (2 credits):

During this elective, the medical students will enhance their diagnostic and clinical skill sets by participating in inpatient, outpatient, and operating room care. Such care will focus on total patient management through record review, medical and dental clinical evaluation, and assimilation and correlation of information leading to differential diagnoses and treatment. The elective will focus on the clinical application of material learned in years one through three as part of the comprehensive VTCSOM oral health/oral medicine curriculum. The locations are Carilion Clinic Dental Care and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): none

Duration: 2 weeks

9932. Elective - CNRV General Surgery (2 or 4 credits):

During this elective, 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 student will work with the community hospital general surgery service handling a broad range of issues. Experience will be gained in how to care for surgical patients pre-operatively and post-operatively. The student will also learn when a referral needs to be made to an outside facility such as a level 1 trauma center. The location is Carilion New River Valley Medical Center.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9933. Elective – Pediatric Otolaryngology/ENT (2 or 4 credits):

This elective will expose students to common head and neck pathologies, including tonsillar and adenoid hypertrophy, otitis media, hearing loss, and airway complications. Students will spend time in the clinic and operating room working alongside a fellowship-trained pediatric ENT. Students will have an opportunity to strengthen their history taking and physical exam skills, in addition to their head and neck fund of knowledge. Students will be allowed to attend surgeries with the expectation that they have a strong knowledge of the patient's history and the procedure they are undergoing. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): none

Duration: 2 or 4 weeks

9934. Elective – Acting Internship in Emergency General Surgery (4 credits):

This elective is designed for fourth-year medical students with a strong interest in surgery and who intend to pursue residency training in surgery. The goal of this elective is to give the students an opportunity to take an active role on the emergency general surgery team. The students will evaluate and recognize patients with emergent surgical conditions, synthesize notes, manage orders, communicate with patients and other health care team members, participate in procedures as appropriate to level of training, and see patients in the outpatient setting after emergent surgical care. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 4 weeks

9936. Elective - Otolaryngology, Head & Neck Surgery-ENT (2 or 4 credits):

The overall goal of this elective 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 locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9937. Elective – Pain Management (2 or 4 credits):

During this elective, students will explore acute, chronic, and cancer-related pain. Working alongside pain specialists, medical students will participate in rounds on inpatient pain consults, outpatient chronic pain management, and perioperative acute/regional pain services. They will develop an understanding of both medical and procedural management to pain, including nerve block techniques and proper opioid prescribing. Emphasis will be placed on interplay between biopsychosocial aspects to pain and the indications for analgesic therapies. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): none

Duration: 2 or 4 weeks

9938. Elective – Surgical Readiness (2 credits):

This elective aims to increase students' proficiency with surgical skills and techniques in order to increase confidence when entering the intern year. Students will spend time in the Virginia Intercollegiate Anatomy Laboratory (VIAL) at Radford University Carilion and the special projects lab at VTCSOM. Other locations may be utilized as needs arise. Students will have an opportunity to strengthen their suturing and knot-tying skills. The course will be tailored to acquiring requisite surgical skills essential to the specialty that interests the student, such as surgical subspecialties, emergency medicine or family medicine.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9939. 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 location is the outpatient clinic.

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

Co-requisite(s): None

Duration: 2 or 4 weeks

9941. Elective - Pediatric Surgery (2 or 4 credits):

This elective 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 genitourinary (GU) and gastroenterology (GI) tract anomalies. Common pediatric hematologic and oncologic conditions will also be reviewed. The physiology and nutrition of babies and children will be emphasized as it relates to the surgical care of these patients. Common procedures specific to this age group, such as venous cutdown and airway management, will be covered. The student will gain experience in the surgical management of common and less common pediatric surgical issues. The locations are the outpatient clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9942. Elective - Plastic Surgery (2 or 4 credits):

This elective 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 plastic surgeons. This is both an inpatient and outpatient rotation. The locations are Carilion Clinic Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2 + 9819

Co-requisite(s): None

Duration: 2 or 4 weeks

9943. Elective - Surgical ICU (2 credits):

During this elective, the student is expected to participate in daily rounds in the intensive care unit (ICU). The student will present assigned patients on rounds, attend all lectures and conferences, and read required material. The student will also have the opportunity to do procedures under close supervision. There will be night-duty hours and on-duty hours, which will follow resident duty-hour regulations. The location is Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

9944. Elective - Trauma Surgery (2 or 4 credits):

The purpose of this elective is to gain familiarity in initial evaluation of trauma patients, including trauma alerts and consultations and 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 locations are Carilion Riverside complex and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 or 4 weeks

9945. Elective – Roanoke Vascular (2 credits):

During this elective, students will gain experience in diagnosis and surgical management of vascular disease and perioperative patient care. Students will also develop knowledge of anatomy and utilizing surgical techniques to safely operate utilizing the atomic knowledge. Students will learn when to use medical versus surgical intervention. The locations are Jefferson Surgical Clinic and Carilion Roanoke Memorial Hospital.

Prerequisite(s): Years 1, 2, 3

Co-requisite(s): None

Duration: 2 weeks

Away Elective

Course Number	Transcripted Course Title
9999	Away Elective

9999. Elective - Away Elective (2, 4, or 6 credits):

This elective notates students enrolled in senior away electives at U.S. Liaison Committee on Medical Education (LCME) accredited medical schools and independent academic medical centers that are members of the Council of Teaching Hospitals and Health Systems (COTH).

Prerequisite(s): Years 1, 2, 3 + Medical Curriculum Committee Approval

Co-prerequisite(s): None

Duration: 2, 4, or 6 weeks

Independent Study

Course Number	Transcripted Course Title
9002	Step 2 Preparation Independent Study

9002. 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 USMLE Step 2 examination due to not achieving a target practice test score, or for students who have taken and failed the USMLE 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 senior dean for student affairs and appropriate faculty to implement this independent study plan.

Prerequisite(s): Years 1, 2, 3

Co-prerequisite(s): None

Duration: 2, 4, or 6 weeks

Research

Course Number	Transcripted Course Title
90RE	MED RES Elective

90RE. 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 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

Special Studies

Course Number	Transcripted Course Title
9984	Special Studies

9984. Special Studies Elective - (2 or 4 credits):

Special Studies courses are designed to be used when a course is being developed or tried for feasibility. Special Studies courses can be created as needed and then a proposal for a permanent course can be submitted through governance.

Prerequisite(s): Years 1, 2 + the successful passage of the USMLE Step 1, associate dean for clinical science years 3 and 4 approval

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.

Prerequisite(s): 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.

Prerequisite(s): 5014 (6H, 6C)

Year 02 Fall Semester

GRAD 5974, Independent Study (6 credits)

Year 02 Spring Semester

GRAD 5904, Project & Report (6 credits)