



Course and Clerkship Objectives and Descriptions

March 2016

Biomedical Science

TRAN 6900 Transition to Medical School (3 credits)

Transition to Medical School course prepares students to understand, participate, and excel in the medical school curriculum. It is divided into three separate weeks. These three weeks are structured as student success weeks, providing students with the structure and opportunities to connect with medical school services and support offices. Throughout these weeks, students explore topics related to their success, building their academic and relationship skills as part of the curriculum domain of Personal and Professional Management. Topics include student organizations, time management, stress management, study skills, learning skills, test-taking skills, information management and library skills, financial aid and planning, personal assessment, and emotional intelligence. Students additionally take a Medical First Responder course, which provides a brief, broad-based introduction to medical emergencies and the health care system. At the conclusion of this course, students become licensed Medical First Responders.

BIOM 7110 Molecular Foundations of Health and Disease (2 credits)

Molecular Foundations of Health and Disease is a three-week course that provides a fundamental understanding of the physiologic basis for macronutrient metabolism including the types of macromolecules that are metabolized to fuel, and physiologic states that alter macronutrient requirements such as starvation, trauma, and metabolic syndrome. The metabolism of glucose, generation of energy from glucose in the form of ATP, the hormonal regulation of glucose homeostasis, and consequences of defective glucose regulation that result in diabetes serve as the central content theme throughout the course. The course provides an introduction to anatomy, genetics, biochemistry, and pharmacology. Clinical cases are presented in a team-based learning format to reinforce basic science concepts as they relate to clinical applications.

Objectives:

- Understand how carbohydrates, lipids, and proteins are utilized as fuels.
- Describe the methods used to measure nutritional status and explain how age, trauma, and starvation alter energy and nutritional requirements.
- Describe the metabolic and pathologic consequences of being obese.
- Define protein structure and the role of enzymes as catalysts, describe enzyme kinetics, and differentiate between competitive and non-competitive inhibitors.

- Describe the structure and function of cellular organelles including cell membranes, illustrate vesicular trafficking, and differentiate the different between the different classes of drug receptors.
- List the major micronutrients, vitamins, and minerals and detect clinical signs of deficiency and toxicity associated with each.
- Characterize how hormonal changes are regulated to affect nutrient metabolism.
- Explain the significance of gene regulation and gene structure.
- Discuss the mechanisms of glucose homeostasis in the body.
- List the diagnostic criteria for diabetes, pre-diabetes, hypoglycemia, hyperglycemia, and metabolic syndrome and understand surgical and pharmacologic treatments for these diagnoses.
- Understand a basic anatomical vocabulary, identify the major organs, and compare and contrast imaging techniques.

BIOM 7120 Cellular Foundations of Health and Disease (4 credits)

Cellular Foundations of Health and Disease is a four-week course that provides a fundamental understanding of the role of cells within the body. Cellular biochemistry, anatomical structure, and physiological function are introduced and then expanded, emphasizing the role of cells as the basic building blocks in a hierarchical system that increases in complexity as cells form tissues, organs, organ systems, and the whole organism. Cellular hormonal and neuronal control mechanisms are described at the biochemical, histological, and physiological levels. The principle of homeostasis is defined at the level of cell, tissues, organs, and at whole body level, with signals arising from the body's four tissue types used as examples of the importance of this process in the control of body function. The autonomic nervous system is described in detail and then employed as the starting point for teaching of the foundations of human pharmacology. Pharmacological principles outlined include pharmacodynamics, pharmacokinetics, pharmacogenomics (personalized medicine), and toxicity. The use of drugs for the treatment of disease is introduced with an overview of how clinical laboratory methodology can be employed to provide scientific data for the diagnosis, evaluation, and monitoring of microbial disease and its pharmacological treatment. The course introduces the basic biology of medically relevant microbes, the basic principles of infectious disease, the underlying mechanisms of microbial pathogenesis, the immunologic basis of disease etiology and pathology, and vaccination and immunotherapy. The course provides an introduction to pathology, and deepens the introduction to anatomy and genetics. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Explain the structural organization of the body into a functional unit from the cellular level to level of the whole body differentiating the four cell types found in the body.
- Define the concept of homeostasis at the cellular, tissue, organ and organism levels
- Explain how the principles of negative and positive feedback, hierarchy, redundancy and, adaptability are integral to homeostatic control.
- List the common parameters of the extracellular fluid compartment that must be homeostatically regulated ($[\text{nutrients}]$; $[\text{O}_2]/[\text{CO}_2]$; $[\text{waste products}]$; $[\text{H}^+] = \text{pH}$; $[\text{H}_2\text{O}]/[\text{Electrolytes}]$; volume and pressure; temperature), including normal blood chemistry values, plasma water and salt content regulation, and basis of cellular volume control.
- Define how ions and molecules are transported across the cellular plasma membrane, epithelial organs, and capillaries, as well as the relevance of these processes to disease, including the ionic basis of cell membrane potential.
- Define the biological and physiological nature of extracellular messengers, differentiating between hormone and neurotransmitter function.
- Explain cellular signal transduction pathways using receptors, second messengers, kinases, phosphatases, and transcription factors, including regulation of plasma glucose levels.
- Compare and contrast the structure and function of the divisions of the autonomic nervous system including sympathetic and parasympathetic systems, cholinergic and adrenergic receptors, synaptic transmission, consequences of receptor dysfunction, and drugs that used to manage receptor dysfunction.
- Describe the pharmacodynamics of drugs in terms of concentration, dose, and response.
- Explain the principles of receptor pharmacology including agonist, antagonist, receptor reserve, drug selectivity, potency, and efficacy.
- Analyze pharmacological effects in terms of ligand or drug-receptor interactions and pharmacological effects in terms of drug absorption and distribution, therapeutic index, and toxicity.
- Use pharmacokinetic principles and data to calculate drug loading and maintenance doses, and effects of drug metabolism, excretion, and elimination effects the plasma concentration of drugs.
- Describe the process in which new drugs are developed, tested, and approved for medical use in the United States.
- Identify the components of personalized medicine and describe how they might impact patient health with regard to pharmacogenomics.
- Describe the basic biology of medically relevant microbes.
- Describe the methodology by which the clinical laboratory diagnoses, evaluates and monitors microbial disease.
- Describe the basic mechanisms of microbial pathogenesis, the epidemiology relating to the management, control, and prevention of disease.

- Explain the pharmacologic principles of antimicrobial therapy and the general therapeutic approach to treat microbial-based diseases.

BIOM 7130 Genetic Foundations of Health and Disease (4 credits)

Genetics Foundations of Health and Disease is a four-week course that provides a fundamental understanding of human medical genetic concepts and clinical disorders that have a genetic component. The course also provides an overview of the basic genetics of medically important infectious agents that contribute to the pathogenesis of infectious diseases. Clinical cases are presented in a team-based learning format to reinforce basic science concepts as they relate to clinical applications.

Objectives:

- Describe the processes of DNA replication, transcription and translation; illustrate the role of templates in these processes; recognize diseases that are associated with defective replication, transcription or translation.
- List the types and causes of DNA mutation, the mechanisms of DNA repair and the functional consequences of mutation.
- Describe mechanisms of genetic/genomic variation that explain variation in normal phenotypic expression, disease phenotypes, and treatment options including genomic imprinting, uniparental disomy, and triplet expansion errors.
- Describe Mendelian inheritance and recognize pedigree patterns such as autosomal dominant, autosomal recessive, X-linked recessive, and X-linked dominant to diagnose a clinical case, and differentiate the inheritance patterns of multifactorial inheritance disorders with single-gene disorders.
- Explain how factors such as reduced penetrance and variable expressivity affect the phenotypic expression of a disease and the observed pattern of inheritance.
- Understand the relationship between gene interactions and the measurable traits of an individual articulating how a single genotype can influence multiple phenotypes through mechanisms such as the function of modifier genes and epistasis.
- Define the concept of epigenetics, explain the role of epigenetic mechanisms in regulation of gene expression, development and disease, and describe how environmental exposures can influence epigenetic modifications.
- Compare and contrast the function and regulation of mitosis versus meiosis, and describe the differences between euploidy, aneuploidy, and other chromosomal abnormalities.
- Describe the key events in early and late embryological development, the genetic processes that regulate development, and diseases that result from

- the disruption of these processes including types of errors in morphology that lead to congenital birth defects.
- Define embryonic stem cells and the different developmental capacities (potencies) associated with these cell types.
 - Describe normal and abnormal mammalian sexual development and explain the factors that control sexual development.
 - Define the clinical indications for cytogenetic/molecular cytogenetic studies, and apply knowledge of cytogenetics and molecular genetics to describe the principles, uses and limitations of genetic testing technologies.
 - Describe the basic concepts of emerging molecular technologies including expression based techniques, exome and whole genome sequencing, and generation of transgenic models.
 - Describe applications of gene targeting in biomedicine and treatment strategies for genetic diseases.
 - Define pharmacogenomics comparing personalized versus non-personalized forms of medical therapy, and describe how biomarkers can be used as indicators of different disease states and could be applied to various clinical situations.
 - Describe the mitochondrial genome and contrast with the nuclear genome.
 - Describe the nucleic acid composition, structure, replication and reproduction of microbes (including prions), and describe the genetic processes that contribute to antimicrobial resistance.
 - Define the general concepts of antiviral drug therapy.
 - Explain how dietary lipids are carried in the blood and the underlying genetic basis and clinical presentation of severe elevations in total cholesterol and low-density lipoprotein cholesterol (LDLc) levels.

BIOM 7140 Metabolic Foundations of Health and Disease (3 credits)

Metabolic Foundations of Health and Disease is a three-week course that provides a fundamental understanding of medical biochemistry related to the metabolism of lipids, carbohydrates, amino acids, and nucleotides with special emphasis on defects in these metabolic pathways and their clinical relevance. Special emphasis is placed on the integration of metabolic pathways and the regulation of metabolism in different organ systems under different nutritional stress. The course also provides insight into ethanol metabolism as well as the formation of reactive oxygen species and the potential tissue damage associated with oxygen radical formation. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Describe the overall design and purpose of gluconeogenesis, its reactants and products, cellular and tissue localization, and how it is regulated.

- Describe the metabolism of fructose and galactose and identify diseases that arise from defects in their metabolism.
- Describe the role of the pentose phosphate pathway in the production of NADPH and pentose phosphate.
- Describe how the urea cycle maintains a proper nitrogen balance, and allows for excretion of excess ammonium in the form of urea.
- Define the roles of folic acid and S-adenosylmethionine (SAM) in the transfer of one-carbon units between molecules.
- Define essential and nonessential amino acids, list which nonessential amino acids can upon certain conditions become conditional essential.
- Identify intermediates from glycolysis, the citric acid cycle and the pentose phosphate pathway that can serve as precursors for the synthesis of nonessential amino acids, and the anabolic reactions of non-essential amino acids.
- Define ketogenic and glucogenic amino acids and the pathways of amino acid degradation.
- Differentiate the following disease states associated with inborn errors of amino acid metabolism: cystinuria, histidinemia, phenylketonuria, methylmalonyl CoA mutase deficiency, homocystinuria, alcaptonuria, maple syrup urine disease, cystathioninuria, and tyrosinemia.
- Describe the structure and synthesis of fatty acids, triacylglycerides, and membrane lipids.
- Describe the process of fatty acid oxidation and the generation of energy from fatty acid oxidation.
- Define the role of fatty acids and ketone bodies in fuel homeostasis.
- Describe the de novo and salvage pathways for purine and pyrimidine biosynthesis.
- List the gene disorders and diseases associated with purine and pyrimidine metabolism, the metabolite that accumulates, and the clinical symptoms of the disease.
- Describe the metabolism of ethanol and the associated toxic effects of ethanol metabolism.
- Differentiate between the major reactive oxygen species (ROS) and reactive nitrogen-oxygen species (RNOS) and forms of cellular toxicity associated with free-radical injury.

BIOM 7150 Foundations of Immunology and Infectious Disease (5 credits)

Foundations of Immunology and Infectious Disease provides a fundamental understanding of the principles of immunology and infectious disease, and the application of this knowledge to immunologic, infectious, and rheumatologic diseases. The five-week course integrates immunology through the learning of microbiology and includes relevant aspects of anatomy, histology, pharmacology, and pathology. Specifically, students: (1) learn about the soluble mediators, cells, and organs of the immune system and how these elements work together to prevent infection; (2) examine how the immune system causes and contributes to diseases such as autoimmunity, allergy, and chronic inflammatory diseases; and

(3) acquire the necessary foundational knowledge of virology, mycology, parasitology, and bacteriology to understand how infectious microbes cause organ-specific and systemic diseases. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications. After completing this course, medical students are able to apply the general concepts of immunology and infectious disease to specific diseases they encounter in future organ-based courses.

Objectives:

- Describe the normal immune response to pathogenic insult and damaged or necrotic tissues.
- Explain the immunologic basis of vaccination, immunomodulation and immunotherapies.
- Describe the development and senescence of the immune system.
- Describe the mechanisms of immune regulation.
- Describe the immunologic basis of diseases with an immune etiology or component.
- Describe the basic biology of medically relevant microbes.
- Describe the mechanisms of microbial pathogenesis.
- Describe the methodology by which the clinical laboratory diagnoses, evaluates and monitors disease.
- Describe the basic principles of infectious disease.
- Explain the pharmacologic principles of antimicrobial therapy.
- Describe the therapeutic approach to treat the pathophysiologic effects of immunologically- and microbial-based diseases.
- Describe the pathologic consequences of infectious and immunologically-based diseases.
- Describe the basic principles of epidemiology as they relate to the study, management, control and prevention of disease.

BIOM 7210 Hematology and Oncology (4 credits)

Hematology and Oncology provides a fundamental understanding of hematological and tumor biology basic science principles, and the application of this knowledge to clinical hematology, hematological oncology, and cancer. The four-week course focuses on the mechanistic and pathophysiological aspects of blood physiology and neoplasia using clinical examples of the various anemias, leukemias, lymphomas, and selected solid tumors. An overview of basic tumor pathology includes development and progression of benign and malignant disease, grading and staging of tumors, carcinogenesis, and metastasis. The course covers the biological mechanisms underlying cellular growth control, cell cycle regulation, apoptosis, tumor immunology, and the roles of oncogenes and tumor suppressor proteins. The pharmacology of major therapeutic agents used to treat hematological disorders and antineoplastic agents is described. Clinical cases are presented in a team-based learning format to provide reinforcement of

basic science concepts as they relate to clinical applications. After completing this course, medical students are able to apply the general concepts of tumor biology and cancer therapeutics to specific neoplastic diseases they encounter in future organ-based courses.

Objectives:

- Describe the morphology of erythrocytes and explain the production and function of hemoglobin, O₂ and CO₂ transport, and ABO/Rh blood types.
- Explain hemostasis and the production and function of coagulation and fibrinolytic factors and predict the consequences of abnormal function of erythrocytes, platelets and blood proteins/hemostatic factors.
- Explain the abnormal processes associated with non-malignant blood disorders including congenital and acquired anemias and cytopenias; cythemia; hemorrhagic and hemostatic disorders; bleeding secondary to platelet disorders and complications of transfusion.
- Explain the abnormal processes associated with malignant blood disorders including leukemia, lymphomas, and myelodysplastic disorders.
- Explain the mechanisms of action, use, and adverse effects of drugs and other therapeutic modalities for treatment of disorders of the hematopoietic system including; blood and blood products, treatments for anemia, stimulation of RBC and leukocyte production, anticoagulants and thrombolytic agents, anti-platelet drugs, anti-neoplastic and immunosuppressive drugs, and drugs used to treat acquired disorders of immune responsiveness.
- Define the characteristics of benign and malignant neoplasms, and describe the system utilized for tumor grading.
- Describe the process of malignant transformation in terms of progression, invasion, and metastasis.
- Differentiate between the types of carcinogens including; chemicals, radiation, environmental factors, and oncogenic viruses.
- Describe methods for the detection of tumors, tumor biomarkers and the diagnosis of tumors including; proteomics, genomics, micro-array analysis, and imaging techniques.
- Describe the process under which chemotherapeutic drugs are developed and enter clinical use (drug trials).
- Classify the common anti-tumor drugs according to their mechanism of action and clinical use.
- Compare different growth factor pathways through the differences in utilization of receptors, second messengers, kinases, phosphatases, and transcription factors.
- Recognize the major mechanisms involved in regulating cell proliferation, including cell cycle checkpoints, growth factors, oncogenes, tumor suppressor genes, interaction with extracellular matrix components, and cell signaling.
- Define and differentiate between necrosis and the intrinsic, extrinsic, and cellular mediated pathways of apoptosis, and the role of apoptosis in tumorigenesis.
- Describe the role of angiogenesis in tumorigenesis.
- Describe the role of immunological evasion and inflammation in tumorigenesis.

- Define senescence and the role of telomerases.
- Define the role of stem cells in tumor biology.
- Describe the role of radiation in the treatment of cancer including radiation safety concerns.

BIOM 7220 Musculoskeletal and Dermatology (6 credits)

Musculoskeletal and Dermatology provides a fundamental understanding of musculoskeletal and dermatological basic science principles, and the application of this knowledge to musculoskeletal and dermatological diseases. The six-week course covers normal features and pathological processes of the musculoskeletal system and integument including embryology, anatomy, histology, biochemistry, genetics, physiology, microbiology, immunology, pathology, pharmacology, and therapeutics. Human gross anatomical dissection is an integral component of the course that facilitates the students understanding of anatomical structure/function relationships. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications. Students gain additional experience in teaching their peers in this course.

Objectives:

- Describe the development/embryology of the musculoskeletal system and limb development.
- Describe the histologic structures of skeletal muscle, bone, cartilage, tendon, and skin.
- Describe normal somatic muscle action.
- Compare and contrast normal and abnormal muscle and joint movement
- Describe the structure/function of elements of the musculoskeletal system and associated pathophysiology.
- Describe infectious and inflammatory disorders of the musculoskeletal system.
- Describe pharmacologic mechanism of drug actions in therapies to treat rheumatologic diseases.
- Describe neoplastic disorders of muscle and bone.
- Describe the musculoskeletal elements responsible for movement of the spine and limbs.
- Demonstrate normal and abnormal musculoskeletal imaging principles.
- Demonstrate the basic science principles (gross and histological anatomy, physiological processes, immunology, microbiology, genetics, biochemistry) as they pertain to the following clinical scenarios: trauma and healing, sports injuries, rheumatologic disorders, and disorders associated with growth and development and aging.
- Describe the development/embryology of skin and associated congenital malformations.
- Describe the structure and function of skin.

- Identify common bacterial, fungal, and parasitic infections, infestations, and inflammatory disorders of the skin.
- Describe skin cancers.

BIOM 7230 Cardiovascular (6 credits)

Cardiovascular provides a fundamental understanding of cardiovascular basic science principles, and the application of this knowledge to cardiovascular diseases. The six-week course covers normal features and pathological processes of the cardiovascular system, including an integrated presentation of embryology, anatomy, physiology, microbiology, and immunology, and their relation to pathologies of the cardiovascular system. Woven through these topics is the practical introduction to key elements of the physical examination of the heart, and basic electrocardiogram interpretation. In addition, current evidence supporting methods of risk assessment, diagnostic testing, and pharmacologic prevention and management of cardiovascular disease are examined. Clinical scenarios such as shock and bradycardia are presented in high fidelity simulation. In addition, clinical cases are presented in a team-based learning format, including valvular heart disease, atherosclerosis, acute myocardial infarction, congenital heart defect, congestive heart failure, and arrhythmias, The simulations and team-based learning cases provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Describe the normal gross structure, histology, and physiology of the heart and vascular beds.
- Describe the gross structure, histology, and pathophysiology of the cardiovascular system seen in common diseases and conditions.
- Compare and contrast the physiology of the systemic and pulmonary circulations.
- Describe the molecular, biochemical and cellular mechanisms that enable the cardiovascular system to maintain the body's homeostasis, especially blood pressure.
- Recognize the molecular basis of cardiac contractility and electrophysiology, and describe how abnormalities of these mechanisms produce important cardiovascular diseases.
- Interpret simple ECG's based on an understanding of membrane potentials and electrical wave propagation in the heart.
- Identify the common electrocardiographic abnormalities and arrhythmias.
- Describe the causes (genetic, developmental, microbiologic, autoimmune, metabolic, toxic, and traumatic) of cardiovascular dysfunction.
- Recognize the importance of genetic factors in the production of certain cardiovascular diseases.
- Describe the clinical presentations (symptoms and signs) of the most common diseases of the cardiovascular system.

- Describe the essential pathological features of important cardiovascular diseases, including hypertension, cardiomyopathy, pericardial disease, ischemic heart disease, and valvular heart disease.
- Identify auscultatory findings associated with common valvular and congenital heart abnormalities.
- Identify and describe heart failure based on an understanding of cardiac preload and afterload.
- Identify and describe valvular heart disease based on an understanding of the events of cardiac cycle.
- Identify and describe ischemic heart disease based on an understanding of the underlying pathophysiology.
- Apply the principles of pharmacology, therapeutics, and therapeutic decision making to cardiovascular dysfunction.
- Demonstrate your understanding of the use and limits of laboratory diagnostic methods in the diagnosis of cardiovascular disease.
- Describe the epidemiology of common cardiovascular maladies within a defined population, and the systematic approaches useful in reducing the incidence and prevalence of those maladies.

BIOM 7240 Pulmonary (6 credits)

Pulmonary provides a fundamental understanding of pulmonary basic science principles, and the application of this knowledge to pulmonary diseases. The six-week course covers normal features and pathological processes of the pulmonary system including embryology, anatomy, physiology, microbiology, and immunology, and relating these to pathologies of the pulmonary system. The course starts with detailed and complete explanations of the physiological mechanisms that underlie the act of breathing, followed by exploration of the developmental anatomy of the lung, the gross anatomy of the upper and lower respiratory tract. Clinical problems and pulmonary function test data is examined at the molecular level, the level of the alveolus, the chest wall, and the pulmonary circulation. The course covers pathophysiological changes in lung function and the spectrum of lung disorders commonly seen in the human population. Ventilation-perfusion inequality and gas exchange defects are presented in team based learning exercises. The neurological basis of ventilatory control is investigated, and the role of central and peripheral chemoreceptors in ventilatory drive are uncovered, including a detailed overview of the biochemistry of hydrogen buffering and the mixed physiological buffering mechanisms of the blood. The clinical conditions of sleep apnea and related disorders, obstructive lung disease, restrictive lung disease, neoplastic lung disease, immune mediated hemorrhage syndromes, bacterial and viral bronchitis, fungal and mycoplasma atypical pneumonia, atelectasis, acute respiratory distress syndrome, pleural disease, acute lung injury and failing heart/pulmonary vascular disease are covered. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Explain the movement of air in the lungs, the transfer and rate of gas exchange across the alveolar membrane, and the homeostatic controls of lung ventilation to insure the needs of the body are met.
- Describe the stages of lung development and the physiologic changes of lung function with aging, including the development of the airways, the alveolus, and the sinuses, the perinatal changes that allow the newborn to breath, and the effects of aging on the respiratory tract.
- Describe the normal gross anatomy and function of the lung, diaphragm, thorax, nasopharynx and sinuses, and visceral and parietal pleurae.
- Describe the normal histological structure of the lung including the respiratory passages, respiratory epithelium, alveoli, and pulmonary vasculature.
- Define standard lung volumes and how they are measured; including forced expiratory flow (FEF), total lung capacity (or volume), airway resistance, compliance, and elastic recoil, and how these factors can alter distribution of ventilation throughout the lung and distinguish between obstructive and restrictive disease.
- Describe the physical-chemical forces responsible for the movement of O₂ into the blood and from the blood to the tissues of the body, describing forms in which O₂ is transported, and determining the % O₂ saturation of hemoglobin and partial pressure of O₂ under various conditions.
- Describe the forces responsible for the movement of CO₂ from the tissues to the blood and list the forms in which CO₂ is transported in the blood, diagraming the relationship between PCO₂ and the concentration of CO₂.
- List factors that allow for adaptation to high altitude.
- Describe the harmful effects of breathing N₂ and O₂ under high pressure, explaining how breathing high pressure gas mixtures influence PaO₂, PaCO₂, and PaN₂.
- Describe the blood flow, mean arterial pressures, venous pressures, and resistances to blood flow in the systemic and in the pulmonary circulations and explain the effects of hypoxic pulmonary vasoconstriction.
- Define the physiological roles of pulmonary surfactant and alveoli interdependence, and describe the consequences of reduced lung surfactant levels.
- Explain the traumatic mechanism by which pulmonary injury can occur, discussing treatment, clinical sequelae, and outcomes; including the pathophysiology of venous thromboembolic disease.
- Describe the dynamic control mechanisms that regulate respiration; including neurological control, and functional properties of central and peripheral chemoreceptors and their role in hypoventilation and hyperventilation.
- Explain the dynamic nature of plasma pH-balance, introducing the physiological concepts of plasma physiological buffering, the isohydric principle, buffering power, and anion gap.

- Define pathophysiology, pharmacological treatment and surgical treatment of obstructive and restrictive airway disease.
- Differentiate the pathophysiology of bronchiectatic syndromes.
- Describe the anatomic changes in airways and lungs that accompany tobacco use.
- Describe the physiology, pathology and histology of lung neoplasms, and describe treatment options (pharmacological/surgical).
- Differentiate normal flora from abnormal flora in the lung, describing the cellular and humoral defenses of the lung, and the etiology of respiratory tract infections (bacterial, viral, and fungal).
- Explain how systemic disorders (metabolic, heart, sleep related, and peripheral vascular disease) affect pulmonary function and describe pharmacological treatment options.

BIOM 7250 Renal and Genitourinary (5 credits)

Renal and Genitourinary provides a fundamental understanding of renal and genitourinary basic science principles, and the application of this knowledge to renal and genitourinary diseases. The five-week course covers normal features and pathological processes of the renal and genitourinary system including anatomy, biochemistry, genetics, physiology, microbiology, immunology, pathology, pharmacology and therapeutics, and preventive medicine. The course includes the structure and function of the kidneys, the regulation of fluids and electrolytes, and the common imbalances of renal physiology that result in disease. Working in groups, students will study a number of renal disorders in a team-based learning format including diabetic nephropathy, hypokalemia, renal cancer, transport disorders, and graft vs. host disease following renal transplantation. The course covers the pathophysiology of electrolyte disorders, acid-base disorders, glomerular disease, tubulo-interstitial disease, acute renal failure, chronic kidney disease, renal replacement therapies, and urology. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Discuss the normal and abnormal embryonic development, fetal maturation, and perinatal changes of the renal and genitourinary system including congenital malformations.
- Describe normal renal/GU structure and function, including the structure and function of the glomerulus and the physical determinants of glomerular ultrafiltration.
- Discuss the regulation of acid-base homeostasis, and interpret metabolic disturbances including electrolyte and acid/base disorders.
- Define renal clearance, renal blood flow, renal plasma flow, glomerular filtration rate, and filtration fraction and list typical values, and the

- myogenic and tubuloglomerular feedback mechanisms that regulate plasma flow and filtration rate.
- Differentiate the transport mechanisms that contribute to the reabsorption of the filtered load of solute and water in the proximal tubule, loop of Henle, and distal nephron that regulate osmolality, water balance potassium homeostasis, ureagenesis, and nitrogen excretion.
 - Describe and interpret the neurohormonal renal axis.
 - Differentiate nephritic and nephrotic syndromes.
 - Describe immune and non-immune mechanisms of renal injury.
 - Evaluate clinical and laboratory data including chemistries, urinalysis, biomarkers, and renal function tests, as they pertain to renal and genitourinary disease.
 - Discuss the effect of systemic diseases, including diabetes, on the renal system.
 - Discuss congenital and genetic disorders affecting the renal/urinary system, including cystic diseases, Bartter syndrome, Gitelman syndrome, and Liddle syndrome.
 - Articulate the role and mechanism of action of drugs used in the treatment of disorders of the renal and genitourinary system including anti-hypertensive drugs and their primary sites of action.
 - Describe the utility of radiologic and urologic procedures available to diagnose and treat common conditions including vesicoureteral reflux, nephrolithiasis, and various causes of urinary obstruction.
 - Review the indications for and mechanisms of renal replacement therapy including hemodialysis, peritoneal dialysis, and transplantation.
 - Describe the pathophysiology of tubulointerstitial and vascular disease.
 - Describe the mechanisms of acute and chronic infectious and inflammatory renal diseases, including acute and chronic pyelonephritis.
 - Describe the mechanisms and clinical course of acute renal failure.
 - Explain the increasing prevalence of chronic kidney disease and its impact on the health care system.
 - Describe neoplastic kidney disease.
 - Integrate basic nutritional sciences with the relevant clinical conditions of the renal and genitourinary organ systems.

BIOM 7260 Gastrointestinal (6 credits)

Gastrointestinal provides a fundamental understanding of gastrointestinal basic science principles, and the application of this knowledge to gastrointestinal diseases. The six-week course covers normal features and pathological processes of the gastrointestinal system including physiology, pharmacology, anatomy, histology, pathology, mucosal immunology, nutrition, biochemistry, microbiology, developmental biology and neuroscience and relating these to pathologies of the gastrointestinal system. The course provides students with a comprehensive understanding of the diseases and disorders of the gastrointestinal system and its associated accessory organs to: (1) diagnose,

effectively treat and manage gastrointestinal-related illnesses, (2) address patient issues and concerns regarding a gastrointestinal complaint and (3) understand the various gastrointestinal-related disorders associated with pediatric and geriatric patients. Clinical sciences and skills include discussion of the common causes of gastrointestinal diseases and disorders, collecting a relevant history based on an abdominal complaint and the appropriate evaluation and treatment of patients with common gastrointestinal abnormalities. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Describe the gross anatomy, histology and function of the GI tract and accessory organs.

Objectives:

- Explain the neurological and endocrine control of GI function.
- List and describe the mechanism of action of drugs to alter GI function.
- Describe the pathogenesis of the major viral, bacterial, viral and parasitic diseases of the GI system.
- Describe the normal embryonic development and congenital malformations of the GI tract, and the repair, regeneration and changes to the GI tract throughout life.
- Describe the synthetic and metabolic functions of hepatocytes, and the pathophysiology of metabolic liver disease.
- Describe the common vitamin deficiencies and toxicities, and match common manifestations with vitamin and mineral deficiencies.
- Describe the process of digestion and absorption of nutrients, how nutritional status is assessed, and describe protein-calorie malnutrition.
- Explain the pathophysiology and chemotherapeutic treatment of neoplastic diseases of the GI tract and describe the genetic susceptibility to neoplasms of the GI tract and accessory organs, including benign and malignant diseases.
- Explain the pathophysiology of pancreatic disease, list the causes for pancreatitis and describe pancreatic replacement therapy and treatment of pancreatitis.
- Explain the pathophysiology of the autoimmune diseases of the GI system, including the pathophysiology, genetics and treatment of inflammatory bowel disease.
- Describe the composition of the normal flora of the GI tract and explain the use of probiotics, prebiotics and fecal transplantation.
- Describe infectious, inflammatory and immunologic disorders of the GI tract (including causes and treatment of cholelithiasis and cholecystitis), the GI defense mechanisms against ulceration, infection and neoplasms and explain how defects in this system contribute to disease.
- Describe the pattern approach to abdominal radiography.
- Explain the link between oral health and systemic disease.
- Describe differences between fluid replacement in children and adults.

- Describe the mechanism of action of antibiotics and vaccines to treat and prevent infectious and non-infectious causes of diarrhea.
- Describe the causes, diagnosis and treatment of intestinal bleeding, and the pathophysiology of the vascular disorders of the intestinal tract.
- Describe common traumatic injuries and causes and treatments for mechanical disorders of GI tract.
- Discuss psychosocial factors caused by GI disorders.

BIOM 7270 Endocrinology and Reproduction (6 credits)

Endocrinology and Reproduction provides a fundamental understanding of classic endocrinology, followed by the basic principles and pathologies specific to men and women, including the complexities of pregnancy. Clinical content is woven throughout the course to reinforce the basic science concepts as they relate to clinical application(s), and at the end of each week a highly integrated clinical case is presented in team-based learning format. The course is subdivided into two major sections. The first half of the course concentrates on classic endocrinology and includes the hypothalamic-pituitary axis, thyroid function, calcium-phosphate homeostasis, and the adrenal gland. The second half focuses on the gender-specific differences and/or similarities between the reproductive systems of men and women. Multiple events illustrate the ‘grey areas’ of reproductive health to highlight the ethical, societal and political challenges evident in this area of medicine. The course concludes with the topic of human sexuality, including interactive discussions about the societal and ethical responsibilities (and challenges) that the modern clinician may face when treating members of the straight and LGBT communities.

Objectives:

- Describe the normal and abnormal embryological development of the endocrine and reproductive organ systems, including the role of environmental influences on development (e.g. Barker Hypothesis).
- Identify gross anatomic structures, composition and function of the endocrine and reproductive organs.
- Identify microscopic structures, composition and function of the endocrine and reproductive organs.
- Identify gross and microscopic pathologies of the endocrine and reproductive organs.
- Describe the normal physiology and pathophysiology of the endocrine system.
- Describe the normal physiology and pathophysiology of the male reproductive system.
- Describe the normal physiology and pathophysiology of the female reproductive system.
- Describe the expected temporal-spatial changes in the mother, placenta and fetus during pregnancy, parturition and the postpartum periods.

- List and identify maternal, placental and fetal pathologies and pathophysiologies that develop during pregnancy, occur during parturition, and develop and/or present in the postpartum.
- Differentiate benign abnormalities from malignant carcinomas of the reproductive system, especially cancers of the breast, cervix, endometrium, ovary and prostate.
- Identify and describe the diagnostic laboratory methods unique to assess normal and abnormal function of the endocrine and reproductive systems.
- Identify, describe and differentiate the pharmacotherapies, including the most common agents and their mechanisms of action, that are used as first-line treatment for the most common endocrine and reproductive disorders.
- Identify and differentiate the types of pain, and associated pain management strategies, as related to the endocrine and reproductive systems.
- Demonstrate competence in taking an age and gender appropriate medical history, and performing a physical examination of the endocrine and reproductive systems.
- Appreciate and describe the complexities of human sexuality, including the role(s) of the healthcare professional team for the 'straight' and LGBT communities.
- Describe the educational background, responsibilities, and professional roles of the healthcare team members that support endocrine and reproductive care.
- Correlate the theory and concepts of the endocrine and reproductive systems with real world clinical applications and settings.

BIOM 7280 Nervous System I (5 credits)

Nervous System I provides a fundamental understanding of neurological basic science principles and an introduction to the application of these principles to diagnosing and treating neurological diseases. The five-week course covers normal features and processes of the nervous system, including embryology, anatomy, physiology, microbiology, and immunology, and relates these to pathologies of the nervous system. The course explores the organization, development, and physiology of the human central nervous system in relation to the essential principles of neurological function. This exploration extends from the cellular and molecular mechanisms of neuronal signaling to the organization and function of sensory and motor systems and of higher order, integrative systems. The course provides an understanding of the neural and vascular anatomy of the human brain and spinal cord that is sufficient for localizing lesions within the central nervous system and that supports understanding and performing an effective neurological examination. The course equips students to interpret impairments of sensation, motor function, and cognition that accompany neurological injury and disease, as well as to develop and test mechanistic hypotheses to explain clinical signs and symptoms. The course provides an introduction

to pharmacological and non-pharmacological treatments for neurological disorders, as well as to basic principles of neuropathology and neuroradiology. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Identify in gross- and histological specimens and in appropriate radiological images key features of: i) the basic organization of the nervous system, ii) the surface anatomy and vasculature of the brain and spinal cord, and iii) the organization of sensory and motor tracts in the brain and spinal cord.
- Describe, diagram, and discuss the fundamental mechanisms of neuronal excitability, signal generation and propagation, and synaptic transmission, as well as mechanisms of signal integration and neural plasticity. Identify common disorders of neuronal excitability, their clinical presentations, and their treatments.
- Describe, diagram, and discuss the roles of glial cells in the central- and peripheral nervous systems; identify clinical signs and symptoms and discuss neurological tests associated with disorders of myelinating cells.
- Describe, diagram, and discuss key principles of the metabolic support of neural function, the organization of the neural microvasculature, and the structures and mechanisms that control movement of nutrients and other materials into and out of the central nervous system. Describe the mechanisms, clinical presentations, and treatment of stroke and other common neurovascular disorders.
- Describe, diagram, and discuss key events and regulatory processes involved in building the nervous system during embryonic development and in early postnatal life. Identify the most common disorders of neural development, their etiology, their clinical presentation, and their prognosis.
- Describe, diagram, and discuss the overall organization and function of the sensory systems that determine our perception of the world and our relationship to it: somatic sensory systems and the proprioceptive, visual, auditory, vestibular, and chemical senses.
- Describe, diagram, and discuss the histopathological and pathophysiological changes underlying common causes of blindness, deafness, pain, and dysfunctions of balance.
- Describe, diagram, and discuss the organization and function of the brain and spinal mechanisms that govern movement of the body and its parts.
- Describe, diagram, and discuss the histopathological and pathophysiological changes underlying common causes of hypokinesia, hyperkinesia, and uncoordinated movement; describe tests commonly used to evaluate movement disorders and the mechanisms of action of common pharmacological agents used to treat them.
- Describe, diagram, and discuss the organization of the autonomic nervous system, identify common causes and effects of autonomic dysfunction, and explain the mechanisms of action of pharmacological agents used to treat autonomic dysfunction.

- Identify the primary regions and mechanisms in the brain that regulate primary integrative functions, including neuroendocrine function, neuroimmune function, emotional regulation, autonomic control, and sleep/wakefulness. Describe the clinical presentation and treatment of disorders of these integrative functions.
- Describe, diagram, and discuss the organization of association systems of the cerebral hemispheres and the structure and function of cortical networks that control consciousness and that integrate perception, memory, and emotion in organizing behavior and planning.
- Recognize the clinical indications of altered mental status and identify common causes of acute and chronic changes in mental status.
- Describe, diagram, and discuss aging-related changes in brain structure and neurological function and the criteria that distinguish normal from pathological aging. Describe neurobiological mechanisms underlying normal- and pathological changes in cognitive- and other neural function that are associated with aging.
- Recognize clinical presentations and describe pathophysiological changes associated with infectious and neoplastic disorders of the nervous system.
- Identify the major classes of neuropharmacological agents, their mechanisms of action, their indications, their pharmacokinetic and pharmacodynamics properties, and their primary side effects and contraindications.
- Describe, diagram, and discuss the structural and functional principles underlying execution and interpretation of neurological and neurocognitive examinations in the clinic.

BIOM 7282 Nervous System II (4 credits)

Nervous System II extends and deepens the understanding of neurological basic science principles provided in Nervous System I. The four-week course covers human development as it relates to normal and abnormal intellectual development and psychological well-being, and explores the biopsychosocial model, including the ability to describe and discuss the mechanisms, clinical presentation, and treatment of common psychiatric disorders (e.g., anxiety, mood disorders, substance abuse, psychoses, compulsive disorders, and personality disorders). In conjunction with the Profession of Medicine course, students develop familiarity with the foundations of effective mental status- and psychiatric examinations, as well as psychological and neuropsychological evaluations. The course covers the indications and pharmacological profiles of medications that are commonly used to treat psychiatric disorders, introduces nonpharmacological treatments for psychiatric disorders, and introduces students to the roles and importance of multi-disciplinary teams in neurological and psychiatric rehabilitation. Clinical cases are presented in a team-based learning format to provide reinforcement of basic science concepts as they relate to clinical applications.

Objectives:

- Describe and discuss the biopsychosocial model, its application to the study and practice of psychiatry, and its specific benefits and limitations.
- Describe, discuss and demonstrate understanding of the bases and elements of effective psychological- and neuropsychological evaluations and of the psychiatric examination.
- Describe, diagram, and discuss the common clinical presentations, etiology and treatment of mood disorders and relate each to current models of their underlying neurobiological mechanisms.
- Describe, diagram, and discuss the common clinical presentations, etiology and treatment of anxiety disorders and relate each to current models of their underlying neurobiological mechanisms.
- Describe, diagram, and discuss the common clinical presentations, etiology and treatment of substance use disorders and addiction in the context of current models of their underlying neurobiological mechanisms, including reward pathways and hypothesized roles of neurochemical and structural plasticity.
- Describe and discuss normal psychological development through childhood, adolescence and adulthood and how that development affects learning and the clinical assessment of intellectual ability.
- Describe and discuss the clinical presentations, etiology, treatment, and current mechanistic models of autism spectrum disorders and intellectual developmental disorders.
- Describe, diagram, and discuss the common clinical presentations, etiology and treatment of attention deficit disorders and learning disabilities in the context of current models of their underlying neurobiological mechanisms.
- Describe, diagram and discuss current theoretical and experimental models of learning and memory and of executive function.
- Describe and discuss models of consciousness as they apply to medical practice in psychiatry and neurology.
- Compare and contrast delirium, psychoses, and other altered states of consciousness with respect to clinical presentation, etiology, neurobiological mechanisms, and treatment.
- Describe and discuss the common clinical presentations, etiology and treatment of somatoform disorders in the context of current models of their underlying neurobiological mechanisms.
- Describe and discuss the common clinical presentations, etiology and treatment of personality disorders in the context of current models of their underlying neurobiological mechanisms.
- Identify the major classes of psychopharmacological drugs, their mechanisms of action, their indications, their pharmacokinetic and pharmacodynamics properties, and their primary side effects and contraindications.
- Describe and discuss the roles of non-pharmacological therapies in the treatment of psychiatric disorders and the roles of multi-disciplinary teams in neurological and psychiatric rehabilitation.

- Compare and contrast the clinical disciplines and practice of neurology, psychiatry, behavioral neurology, and neuropsychiatry.

Profession of Medicine (POM)

PROF 7310 (5 credits), 7312 (5 credits), 7320 (6 credits), 7322 (6 credits), 8330 (2 credits), 8332 (2 credits) Profession of Medicine 1-6

The Profession of Medicine courses are longitudinal throughout the first three years of the curriculum that integrate the art and science of medicine to ensure a well-rounded, compassionate physician that serves patients, families, and society. The course complements each organ-based module during the Foundations of Medicine Phase (Years 1 and 2) as well as the Clinical Applications Phase (clerkships during Years 3 and 4). The coursework includes 11 focus areas: active citizenship, cultural competence, communication, quality improvement and patient safety, medical humanities, medical legal issues, business of medicine and health policy, personal management and self-care, professionalism, research, history and physical examination skills, clinical skills, and systems-based practice.

Active Citizenship Objectives:

- Define common terms associated with public health.
- Describe the history of public health in the United States.
- Describe demographics of a population in a local community.
- Describe the difference between what is meant by the terms health equity and health disparity.
- Discuss the epidemiology of common diseases within a population.
- Discuss systematic approaches to reducing morbidity and mortality associated with diseases in a population.
- Identify the non-biological determinants of health and the economic, psychological, social and cultural factors that contribute to the development and sustainment of disease.
- Describe the role of the three levels of government in health policy.
- Describe the current role of the three levels of government in the health care for citizens.
- Develop a comparison table outlining strengths and weaknesses of different health care plan models.
- Describe the health statistics used in public health research.
- Describe models for community health and outcome based research.”
- Students will be able to:
 - Implement effective strategies for collaboration with community partners.
 - Develop mutually beneficial relationships with community leaders and other stakeholders.
 - Describe lessons learned using the process of critical reflection.
 - Plan a community-based health initiative.

- Prepare an oral presentation for community and faculty.
- Develop an effective working team for implementation of a community project.
- Implement a service project that is based on a community identified need.
- Prepare a professional presentation based on a community service project.

Clinical Skills Objectives:

As a result of course lectures, readings, labs, longitudinal preceptor experience, and other Clinical Skills (CS) activities, the medical student will:

- Use professional and ethical behavior in providing medical care.
- Demonstrate effective interpersonal communication skills to build effective and empathic relationships with patients, families and health-care professionals.
- Demonstrate the ability to apply scientific knowledge and method to clinical problem solving.
- Demonstrate the ability to take a comprehensive and focused clinical history.
- Demonstrate the ability to perform a complete physical examination.
- Demonstrate the ability to perform a mental status examination.
- Implement effective critical thinking skills in a clinical setting.
- Demonstrate effective clinical reasoning and problem identification.
- Demonstrate the ability to generate an appropriate basic differential diagnosis.
- Demonstrate the ability to accurately document patients' histories and physical findings, assessments, and plan of care.
- Demonstrate the ability to give an accurate, organized and complete oral presentation on patients.
- Perform basic clinical procedures as required.
- Demonstrate patient-focused clinical care based on the patient's unique demographic profile.
- Model patient-centered care embodying advocacy, moral, ethical, legal and public health principles.

Professions Objectives:

At the end of the course, the medical student will:

- Describe how biostatistics applications impact clinical practice
- Describe how complementary/alternative healthcare impacts evidence-based patient care
- Describe the impact of cultural competence on providing quality patient care
- Recognize the signs of domestic violence/abuse in patient care
- Explain the use of epidemiology sciences in patient care and community healthcare
- Apply concepts of evidence-based medicine in research methodology for healthcare practitioners
- Explain the role of health advocacy in the career of a physician
- Explain the role of health informatics in providing patient care
- Describe the various healthcare systems' impact on community and global health

- Describe health disparities in specific sub-cultures of the population
- Describe the role of health literacy in patient care
- Describe current health care policy
- Describe through case discussion examples of the definition of effective leadership for physicians
- Apply concepts learned in ethics to dilemmas faced by practicing physicians using the recommended guiding principles
- Describe the importance of the medical humanities in the practice of medicine
- Describe legal regulations governing patient care that impact providers
- Recognize medical terminology used in Spanish-speaking cultures
- Define what is meant by palliative care
- Describe health problems, risk factors, treatment strategies, resources and disease prevention/health promotion in community and global healthcare settings
- Explain models for different levels of preventative medicine
- Demonstrate professionalism characteristics valued by the medical profession
- Explain how principles of quality improvement and patient safety directly impact patient care and healthcare systems
- Describe how translation research impacts patient care

Introduction to Clinical Experiences (ICE)

CLIN 7410 (1 credit), 7412 (1 credit), 7420 (1 credit), 7422 (1 credit)
Introductory Clinical Experiences 1-4

Introductory Clinical Experience - Overview

The Introductory Clinical Experience (ICE) Course exposes MS1 and MS2 students to a wide array of clinical activities. Beginning early in Year 1 and continuing through the end of Year 2, students spend 3-4 hours during each ICE week participating in a clinically related activity. ICE is organized into four-week blocks; four in Year 1 and six in Year 2. Within each four-week ICE block, students will rotate among four core components: Longitudinal Clinical Experience, Primary Care, Clinical Rotations, and Inter Professional Experience (see Table below). ICE is intended to provide early clinical exposure and, whenever possible, to provide real world clinical correlations to topics being covered in the Foundations of Medicine courses.

Longitudinal Clinical Experience

The Longitudinal Clinical Experiences (LCE) component of ICE provides students with exposure to a model geriatric care program and affords students to work with the same geriatric patients over an extended period of time during their first two years. LCE is offered at CentraCare, a PACE (Program of All-Inclusive Care for the Elderly) organization. The mission of CentraCare is to provide comprehensive care for frail older adults. The care provided at CentraCare is centered on the belief that interdisciplinary care is the best type of care for this patient population, and that frail older adults are best served in their own home in the community as they age.

Students will participate in LCE during one of every 4 ICE weeks at the CentraCare location in either Kalamazoo or Battle Creek. In each session, students will observe the interdisciplinary approach to care for this patient population and interact with the interdisciplinary team members as they care for CentraCare patients. The ICE LCE at CentraCare will enable students to gain insight into the disciplines crucial to providing comprehensive care for frail older adults and to maintaining them safely in the community. In addition, the LCE is structured in a longitudinal format with continuity of relationships with the interdisciplinary team members and with specific participants with whom students will be paired. During the systems-based Foundations of Medicine Courses, each LCE session will include an educational activity that will address geriatric considers related to the system being studied.

LCE Objectives: Upon completion of LCE, each student will be able to:

- Describe different interventions used at PACE to improve quality of life of older people.
- Explain the three tenets of the framework for comprehensive and patient-centered geriatric health care.
- Discuss the concept of the all-inclusive care business model of the PACE program.
- Describe effective delivery of geriatric health care in an interdisciplinary team setting.
- Demonstrate empathy when interacting with an older adult.
- Demonstrate effective communication when interacting with an older adult.
- Describe how an older adult's healthcare needs impact the approach to his/her care in the PACE program.
- Demonstrate the ability to review, with a geriatric patient, their medication list to identify potential medication interactions and/or special considerations for geriatric patients.

Primary Care Experience (PC)

The Primary Care component of ICE occurs once during each four-week ICE block. Two half-day sessions in Family Medicine and two in Pediatrics are offered in Year 1 and six sessions in Internal Medicine are offered in Year 2. During Primary Care students will become increasingly comfortable seeing patients by themselves. Resident and attending physicians will serve as clinical preceptors. To the extent possible, students will work with the same clinical preceptors. Students are expected to encounter a variety of primary care patients. Clinical preceptors will be made aware of the Foundations of Medicine course topics being covered during each four-week ICE block. Whenever practical, preceptors will attempt to correlate these topics with actual patient encounters.

Primary Care Objectives:

Upon completion of PC, each student will be able to:

- Discuss the titles, roles and scope of work for the common positions present in a primary care practice (receptionists, schedulers, billers, nurses, medical assistants, attending physicians, resident physicians).
- Describe concepts of primary care pediatric and adult preventive health care.
- Identify barriers and enablers to effective patient-physician communication.
- Describe the concept of the “patient-centered medical home”.

Session 1: Observe roles of the various personnel at the practice. Complete the practice observation form

Session 2: Assist MA or nurse in welcoming the patient to the examination room, measuring vital signs, and determining the purpose of the encounter. Observe the physician during the encounter. Additional encounters as time permits.

Session 3: Observe the physician during patient encounters, as time permits. For at least one encounter, obtain the chief complaint or primary reason for the encounter.

Session 4: Observe the physician during patient encounters, as time permits. For at least one encounter, obtain the chief complaint/primary reason for the encounter and obtain the history of present illness.

Community Care Experience

During each of the four ICE blocks during Year 1, students will participate in a 4-hour Community Care Clinical Rotation. During the first two blocks of Year 1 students will spend one 4-hour session with a fire department medical first responder unit and one session with a paramedic ambulance. These sessions are intended to allow students to perform basic emergency medical assessment and treatment skills that they just acquired during the medical first responder course. During the last two blocks of Year 1, students will spend an additional 4 hours assigned to a paramedic ambulance and another 4-hour session spent with home healthcare nurses. The latter provides students with insight into the important role homecare nurses play in the healthcare system. All of these

experiences afford students the unique opportunity to gain insight into diverse home environments that are representative of those of their future patients.

Community Care Objectives: Upon completion of CC, each student will be able to:

- Describe professional attributes of homecare nurses and EMS personnel.
- Describe various types of home environments and discuss how the environment may impact a person's health.
- Describe the roles homecare and EMS play within the broader healthcare system.
- Demonstrate the ability to accurately measure vital signs.
- Demonstrate the ability to perform any skill considered to be within the scope of practice of a medical first responder (EMS rotations only).
- Describe basic components of a home safety assessment (homecare only).
- List at least 15 medications carried on a paramedic unit and their basic emergency indications.

Emergency Care Experience

The Acute Care Clinical Rotations take place in hospital emergency departments during each of the six ICE blocks throughout Year 2. While students will not be conducting the initial assessment, they will be able to assess patients who present with various acute clinical conditions. It is anticipated that during each 4-hour session there will likely be at least one patient with a clinical condition that correlates to the student's current Foundation of Medicine topic. Resident and attending emergency physicians will serve as clinical preceptors. In addition to assessing patients, students will also have opportunities to perform or assist in a variety of common emergency procedures.

Acute Care Objectives: Upon completion of EC, each student will be able to:

- Assist emergency physicians or other clinicians in the care of emergency patients.
- Describe the initial presenting signs and symptoms of encountered/common emergency department complaints.
- Demonstrate the ability to perform a history and physical examination on an emergency department patient with an acute (or acute on chronic) condition.
- Demonstrate the ability to discuss/interpret basic laboratory, radiographic, and EKG studies (previously covered in Foundations of Medicine course material).
- Demonstrate the ability to perform skills learned during the Clinical Skills and Medical First Responder Courses.
- Describe the characteristics of a team-approach to managing a seriously ill or injured emergency patient.
- Describe how past medical records contribute to the care of the emergency patient.
- Discuss clinical factors used to determine the need for hospitalization of an emergency patient.
- Describe the importance of post-discharge primary or specialty care follow-up of emergency patients.

Interprofessional Experience

The Interprofessional Experiences (IPE) component of ICE consists of a series of singular 3-hour sessions in which students gain insight into a wide variety of healthcare professions. The IPE experiences will frequently correlate with Foundations of Medicine topics being studied.

Year 1 IPE Experiences

Clinic Nursing

Audiology and Visual Services

Hospital Infection Prevention

Public Health Communicable Diseases

Year 2 IPE Experiences

Echocardiography

Respiratory Therapy

Radiology

Hospital Clinical Pharmacy

Rehabilitation - Physical Therapy

Rehabilitation - Occupational Therapy

IPE General Objectives: Upon completion of IPE, each student will be able to:

- Describe the educational background of IPE-related healthcare professions.
- Describe the manner in which IPE-related healthcare professionals impact patient care.
- Discuss how IPE-related clinical exposure adds relevancy to Foundations of Medicine course material.
- Describe the manner in which physicians interact with other healthcare professionals.

Other

MEDU 6800 Advances and Perspectives in Medicine and Health (0.5 credits)

Advances and Perspectives in Medicine and Health provides students in the professional health-related sciences both exposure to and an opportunity for involvement in current topics that influence the practice, quality, and delivery of health care. The course consists of a series of events that includes seminars, workshops, plays, demonstrations, simulations, and conferences that are distributed throughout the academic year. Topics covered in the series of events include ethics, professionalism, communication, health policy, health disparities, delivery of care, biomedical/translational/clinical/community-based research, bioengineering, business and legal aspects of health care, health informatics, and global health. For some events, there are opportunities to participate in interprofessional discussion groups that include students from other health profession programs, as well as health care professionals. Students develop critical thinking skills and raise awareness to cross-disciplinary aspects and

integration of health care teams, through attendance and reflection of the events in this course.

TRAN 7900 Transition to Clinical Applications (3 credits)

Transition to Clinical Applications provides the bridge between foundations of medicine and the clinical application of medical knowledge. The course begins with a comprehensive summative examination over years 1-2. Focus quickly shifts to preparing students to thrive in the clinical setting. Students participate in BLS recertification and ACLS training. They are also reviewed and assessed on procedural skills utilized from day one of their clinical experience. Students are introduced to a method for studying for USMLE Step 1 during their third year, and participate in simulation, as well as group-based workshops and discussions in preparation for the Clinical Applications phase of the curriculum.

Objectives

At the end of the Transitions to Clinical Application course, the year 2 medical student will:

1. Describe the professional traits associated with the roles, responsibilities and expectation of a clinician.
2. Perform the clinical procedures and skills appropriate for a third year medical student.
3. Use interpersonal communication skills in clinical interactions that promote quality patient care and education.
4. Manage their personal health and wellbeing as they fulfill clinical duties.
5. Apply knowledge of biomedical, epidemiological, and socio-behavioral sciences to clinical care.
6. Demonstrate collaborative and cooperative team member behavior as they contribute to providing quality patient care.
7. Provide patient care that acknowledges awareness of health care resources available.
8. Use available technology to improve patient care and learning.

Clinical Electives – Years 1 & 2

NOTE: Sections in blue are currently unavailable.

ANES 7510 Selected Topics in Anesthesiology

Section 1 Overview of Anesthesiology

This section will provide an introduction to the specialty of Anesthesiology. Each day the student will be exposed to a different facet of the specialty. Daily assignments might

include observing general anesthesia, pediatric anesthesia, regional anesthesia, cardiac anesthesia, neuroanesthesia, obstetrical anesthesia, and/or outpatient anesthesia.

Objectives:

- Upon completion, the student will be able to describe the role and duties of a practicing anesthesiologist in an evolving health care environment
- The student will be able to describe the purpose of surgical anesthesia
- The student will be able to describe the differences between general anesthesia, regional anesthesia, and monitored anesthesia care
- The student will be able to describe various procedures performed routinely in the provision of anesthesia care
- The student will understand various factors that influence patient safety in the surgical setting

Section 2 Pharmacology of Anesthetic Agents

This section will provide an introduction to the wide range of pharmacologic agents used within our specialty. Each day the student will be assigned to observe the provision of surgical anesthesia with an emphasis on the use of different families of pharmacological agents. Daily assignments will be made to illustrate the use of local anesthetics, sedatives and hypnotics, inhalational anesthetics, muscle relaxants, and other agents.

Objectives:

- Upon completion, the student will be able to describe the role and duties of a practicing anesthesiologist in an evolving health care environment
- The student will be able to describe various families of anesthetic agents and their uses
- The student will be able to describe the side effects of various anesthetic agents, with an emphasis on respiratory depression, and its treatment
- The student will be able to describe various economic factors effecting the provision of anesthetic agents such as drug shortages, product recalls, formulary design, and the anesthesia care team
- The student will understand various factors that influence patient safety in the surgical setting

Section 3 Pain Management

This elective occurs in an ambulatory Pain Clinic setting where students will be exposed to patients referred for acute and chronic pain management. Students will attend daily clinic and will have assigned outside reading. Students will be exposed to the indications for pain management referral, as well as patient evaluation, drug interactions, and follow-up needs. Student schedules will be arranged so that the total time commitment will average 25-30 hours per week.

Objectives:

- Upon completion, the student will be able to describe the role and duties of pain management specialists
- The student will learn introductory knowledge of various pharmacologic approaches to pain management
- Students will be able to describe patients for whom pain management referral is appropriate
- Students will be exposed to a variety of nerve blocks used in the management of painful conditions
- The student will be able to distinguish between the different types of pain

BINF 7510 Selected Topics in Biomedical Informatics

Section 1 Introduction to Scholarly Journal Publishing

This exploratory topic is designed for students who are interested in the mechanics of scholarly publishing, editorship and authorship as part of their academic career. Publishing now encompasses a broader, more interdisciplinary skill set that includes digital publishing technologies, data repositories, open peer review, and research funding mandates on depositing final post-prints. Students will gain knowledge in the publishing process including types of published works, publisher business models, the peer review process, authors' rights in regards to copyright, and research integrity.

Total time expectation will be 20-30 hours per week with time allowed for students to prepare before meeting by completing assigned readings or individual learning activities.

Objectives:

- To become familiar with the scholarly publishing process
- To become familiar with the roles and responsibilities of the publisher, editor and author
- To recognize authority resources for critically evaluating and measuring research influence and impact of journal titles in a discipline
- To understand the role of article level metrics and its measured activity around academic research
- To become familiar with the peer-review process, and author-rights and how it relates to copyright
- To identify research bias, funder transparency, and ethical behavior in disseminating scientific discovery in scholarly communication

Section 2 Developing Your Publication Plan

This topic will provide students the opportunity to explore and formulate a proposal for planning, conducting, and publishing their scholarly research project. Students are guided

through the scholarly writing and publishing process to successfully find the appropriate outlet to disseminate their work.

Total time expectation will be 20-30 hours per week with time allowed for students to prepare before meeting by completing assigned readings and their individual publication plan.

Objectives:

- To identify the essential steps of planning and writing a scholarly paper.
- To develop a personal publication plan
- To understand the pros and cons of collaborative authorship and engaging in ethical behavior by citing sources and avoiding plagiarism
- To learn how to identify and approach a writing mentor
- To identify publication opportunities
- To describe the writing process, including management of deadlines, resources that can assist in the literature search, following author guidelines, and preparing manuscripts for publication
- To learn strategies for getting published and handling rejection

BIOM 7510 Selected Topics in Biomedical Sciences

Section 1 Advanced Anatomy Prosection

Students will perform an advanced prosection of a specific body region (e.g., Head and Neck, Thorax, Abdomen, Spinal Cord, Upper Limb, Lower Limb, or Pelvis). In addition, students will annotate at least two articles with reference to: standard bibliographic reference and a concise synthesis of the article. Students are evaluated according to their ability to summarize and articulate how each publication relates to their prosection and integrate it with medical practice. Upon completion of the prosection, students will present their project to an instructor and other students enrolled in the elective. The final presentation will include a description of the anatomy of the prosected region, any pathologies that were discovered during the process and how they may have presented in life, and how the prosection relates to the literature review.

Total time expectation is 20-30 hours per week.

Objectives:

Upon completion of this course, a student will:

- Be able to demonstrate and describe the structures and relationships of specific body regions
- Be able to search for and find appropriate anatomical literature
- Be able to integrate literature review and laboratory experience

EMER 7510 Selected Topics in Emergency Medicine

Section 1 Emergency Medicine

Students will work alongside emergency medicine faculty and senior level residents caring for patients in a high volume emergency department. Students will work three, eight hour ED shifts, and will also attend weekly emergency medicine conferences. Total time expectations will be 25-30 hours per week.

Objectives:

Upon completion of the elective the student should develop a basic differential of common emergent causes of:

- Abdominal pain
- Chest pain
- Headache
- Respiratory Distress

Section 2 Emergency Medical Services

Students will gain familiarity with a high performance prehospital care system. Along with EMS faculty and staff, they will attend various standing administrative meetings, and weekly emergency medicine conferences. They will complete 3, 8-hour ride along shifts with paramedics and EMT's. Total time expectations will be approximately 25-30 hours per week.

Objectives:

The student will develop a basic understanding of:

- EMS system function
- Pre-hospital medical direction (online and offline) and physician oversight
- Participation in the provision of pre-hospital care
- Role of members of the prehospital health team
- Interactions with members of the prehospital health team

Section 3 Medical Response Unit

Alongside senior emergency medicine resident physicians, students will serve on WMed's Medical Response Unit, a specially-outfitted EMS response vehicle equipped with emergency response capabilities, medical equipment and tools not available on standard ambulances. Students will respond to major, high-acuity EMS calls, such as multi-casualty incidents, cardiac arrests, multi-alarm fires and major traumas. Students will attend weekly emergency medicine conferences, and will work three 8-hour shifts for a total time expectation of approximately 25-30 hours per week.

Objectives:

The student will develop basic understanding of:

- EMS system function
- Pre-hospital medical direction (online and offline) and physician oversight
- Participation in the provision of pre-hospital care
- Role of members of the prehospital health team
- Interactions with members of the pre-hospital health team

Section 4 Emergency Medicine Research

Students with ongoing involvement in select research projects may receive permission to devote a week of dedicated time. Maximum time expectation will be 25-30 hours.

FMED 7510 Selected Topics in Family and Community Medicine

Section 1 Family Medicine Maternity Care

Description and time expectation: This is a 30-hour experience. The first day of the course is devoted to completing the Basic Life Support in Obstetrics (BLSO ©) course. Subsequently, the student will work with the residents and faculty in triage and on Labor and Delivery, involved directly in prenatal care and delivery.

Objective:

- To equip students with the basic skills needed to assist in normal and emergency obstetric situations

Section 2 Sports Medicine

Description and time expectation: This is a 30-hour experience. The student will work directly with fellows and faculty in the ambulatory setting providing pre-participation evaluations and evaluation and treatment of musculoskeletal injuries.

Objectives:

- Evaluate common sport-related musculoskeletal problems
- Evaluate common medical disorders with implications for sports participation
- Conduct pre-participation evaluation
- Discuss common procedures in treating sports related problems

Section 3 Hospital Family Medicine

Description and time expectation: This is a 30-hour experience. The student will work with the residents and faculty on the inpatient Family Medicine Service, caring for hospitalized patients. The student will have the opportunity to do night call with the team.

Objectives:

- Improve ability to evaluate and initiate management of patients requiring hospitalization
- Enhance case presentation, team management and discharge planning skills
- Gain familiarity with the use of consultants

Section 4 Ambulatory Family Medicine

Description and time expectation: This is a 30-hour experience. The student will work directly with the residents and faculty in the ambulatory setting and can expect to be involved directly in preventative services, care of acute and chronic conditions, prenatal care, and basic office procedures.

Objectives:

- Develop an understanding of the biopsychosocial model in health care
- Become familiar with the evaluation and management of common acute presentations presenting to a primary care office
- Use an evidenced based approach to treat chronic medical conditions presenting to a primary care office
- Apply basic principles and evidence regarding prevention to patients of all ages

Section 5 Hospice/Palliative Care Elective

Students will participate in an interdisciplinary team patient care meeting with nurse practitioners, physicians, social workers, hospice nurses, volunteers, and chaplains. Students will accompany a hospice/palliative care nurse on a home visit, visit Kairos Dwelling (a nonprofit community home for hospice patients), and round on the inpatient palliative care service with a physician; meet with the Counseling Services Supervisor to review the bereavement program and with the Hospice Management team to discuss program focus including regulation and quality; learn about volunteer outreach activities. Total time expectation: 25-30 hours per week.

Objectives:

- Introduce students to the importance of interdisciplinary team management of hospice/palliative care patients and the individualized care provided to the patient and their family

MEDU 7510 Selected Topics in Medical Education

Section 1 The Medical Career

Students will work with medical educators to understand what is involved in a variety of career paths for new physicians, including academic medicine. In addition to discussion with faculty members, students will read books and articles on medical careers and interview three physicians on three different career paths. On completion of this elective, students will be able to describe possible choices for their own careers. Total time expectation will be 25-30 hours per week.

Section 2 Teaching & Learning in Medical School

Students will work with medical educators to understand how medical students learn and how different styles of teaching enable or detract from student learning. In addition to discussion with faculty members, students will read books and articles on learning and teaching styles and will design a teaching module in a subject of their choice. On completion of this elective, students will be able to design a teaching module from objectives to assessment. Total time expectation will be 25-30 hours per week.

Section 3 Educational Research – The Scholarship of Teaching and Learning

Students will work with medical educators to design a research project on the impact of teaching strategies on medical student learning. In addition to discussion with faculty members, students will read a variety of books and articles on educational research design and propose a study based on their own interests. On completion of this elective, students will be able to propose an educational research project. Total time expectation will be 20-25 hours per week.

Section 4 Massage Therapy Elective – An Overview and Experience

This course will provide an overview of massage therapy. Students will learn about the benefits of massage therapy as well as therapeutic massage techniques. Massage techniques will be demonstrated, practiced, and received by students. Through this approach, students will understand and experience the benefits and importance of therapy for their own health as well as for their patients.

Objectives:

Students will:

- Understand the importance of self-care for physicians and patient well-being
- Understand and experience the benefits of massage therapy

- Understand the broad spectrum of benefits of massage therapy in the management of stress and promotion of health/wellness
- Understand and demonstrate effective and safe preparation of massage equipment
- Understand and demonstrate effective and appropriate preparation prior to giving a massage, draping techniques, and full-body relaxation massage

Section 5 Animated Presentations in Medical Education

Students will work alongside Medical Education faculty and staff to produce a focused animated presentation to be used in preclinical medical education. Students will attend instructional meetings and work independently. Total time expectations will be 25-30 hours per week.

Objectives: Upon completion of the elective the student should develop a basic animated presentation to explain a med-biological process.

Reading: Students will be exposed to a variety of options available to produce animated presentations, and read on the benefit of using animation for learning. Reading and video sources will include selections from the tentative references listed below.

Objectives:

The student will:

- Analyze the components of a bio-medical concept
- Create a storyboard with script of the steps involved in a selected bio-medical process
- Develop a 5 to 10 minute animated presentation of a med-biological process

Section 6 Self-Care and Wellness for the Medical Student

This is an experiential class introducing students to a holistic wellness approach based on various self-care and stress reduction techniques that can be incorporated into a personal wellness plan. Self-care and stress reduction techniques help reduce career burnout, support injury prevention and maintain health in medical students. Students will be guided through physical, behavioral, and mental techniques to enhance a general self-care and wellness personal plan. Topics such as stress, sleep, nutrition, meditation, and massage will be discussed.

Objectives: At the end of this course, students will be able to:

- Identify personal stressors
- Identify self-care activities to maintain health
- Implement stress management tools
- Create a personal wellness plan

Section 7 Informed Consent: The Intersection of Law, Ethics, & Patient-Centered Care

Informed consent is more than just a legal doctrine – it sits at the intersection of both law and medicine. To fully understand “informed consent,” a collaborative approach is needed that takes into account the medical implications of consent, the legal requirements for obtaining consent, and the ethical issues that can arise when obtaining consent. This collaborative course joins WMed students and WMU-Cooley law students in a weeklong exploration that will transform the way students understand informed consent.

At the beginning of the week, students will be paired into teams consisting of at least one law student and at least one medical student. Throughout the week, these teams will actively collaborate to (1) explore informed consent from their unique professional perspectives, and (2) create health-literate consent processes that both better inform patients and better protect providers.

Total time expected for the course will be approximately 25 hours. This will include 15 hours of in-class instruction & collaboration, 3-6 hours of reading, and 4-6 hours to complete the required collaborative assignments. All required readings will be available electronically through the WMed Medical Library and will include some legal cases made available to students by pdf.

Objectives: At the end of the course, students will be able to:

- Understand the differing legal requirements in obtaining consent in clinical practice settings and for obtaining consent in research trials.
- Identify informed consent “forms” that are not likely to be understandable to patients with low health literacy.
- Identify poorly designed informed consent processes used in various healthcare settings.
- Design patient-friendly consent processes that better protect the provider and better inform patients with low health literacy.
- Create health-literate consent processes that better protect the organization and better engage patients with low health literacy.

MED 7510 Selected Topics in Medicine

Section 1 General Internal Medicine Clinic

Students will work alongside departmental faculty and supervising residents caring for internal medicine patients in the Department’s Internal Medicine Clinic. Students will attend Pre-Clinic Conference (8am) with the faculty & residents and then attend clinic from 8:30 AM to 12 noon. Students will also attend weekly Internal Medicine block conferences. Time expected is 20-30 hours per week.

Objectives:

Upon completion of the elective the student will:

- See common clinical problems in outpatient Internal Medicine practice, including triage of acute and chronic problems and provision of appropriate preventive medicine services
- Assesses purpose of each patient visit, eliciting a level-appropriate history and exam related to presenting problem(s)
- Demonstrate appropriate interactions and relationships with patients and families
- Demonstrate appropriate awareness of potential roadblocks to patient compliance, including patient educational level, language barriers, financial resources, and support systems available for transportation and implementation of diagnostic and treatment plans

Section 2 Cardiology

Students will work alongside internal medicine residents and faculty affiliated with Advanced Cardiology. Students will attend morning report with faculty & resident, as well as attend weekly Internal Medicine block conferences. They will work with assigned residents and faculty in the inpatient setting. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will:

- Obtain a level-appropriate cardiac history
- Perform a level-appropriate cardiovascular exam
- Recognize patients presenting with CHF
- List a level- appropriate differential diagnosis of patients presenting with chest pain

Section 3 Infectious Disease

Students will work alongside internal medicine residents and ID faculty. Students will attend morning report with faculty & residents as well as weekly Internal Medicine block conference. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will:

- Obtain a level-appropriate history from patients suspected of having infectious diseases
- Perform a level-appropriate exam on such patients.
- Understand basic microbiology and prevention of infectious diseases

- Understand basic principles of epidemiology and transmission of infection including environmental, occupational and host factors that predispose to infection

Section 4 Nephrology

Students will work alongside internal medicine residents and Nephrology faculty. Students will attend morning report with faculty & residents as well as weekly Internal Medicine block conference. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will:

- Obtain a level-appropriate history from patients suspected of having renal diseases
- Perform a level-appropriate exam on such patients
- Generate a basic differential diagnosis for common clinical presentations suggesting acute or chronic kidney disease
- Demonstrate level-appropriate understanding of simple fluid, electrolyte and acid-base disorders

Section 5 Palliative Medicine

Students will work alongside internal medicine residents and faculty. Students will attend morning report with faculty & residents as well as weekly Internal Medicine block conference. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will:

- Obtain a level-appropriate history from patients needing palliative medicine consultation
- Perform a level-appropriate exam on such patients
- Recognize medical, social and psychological decision affecting palliative care
- Participate in family meetings with multidisciplinary teams for determination of appropriate care

Section 6 Academic Internal Medicine

Students will work alongside internal medicine residents and faculty in the inpatient Academic Medicine service of either Bronson Methodist Hospital or Borgess Medical Center. Students will attend sign out rounds (7am) and morning report (at 8am) with the faculty & residents, as well as attending weekly Internal Medicine block conferences. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will:

- Obtain a level-appropriate history from patients presenting to the Academic medicine service
- Perform a level-appropriate exam on such patients.
- List level-appropriate differential diagnoses on such patients
- Demonstrate appropriate interpersonal communication skills with patients, families and team

Section 7 General Medical Hematology/Oncology

Under the supervision of Drs. Sreenivasa Chandana, Sunil Nagpal, Sanja Kaluza and Mohammad Omaira, students will gain exposure to a general medical hematology/oncology patient population. They will attend all Tumor Conferences, and round with medical oncologists and hematologists. Students will present one patient with a hematological disease to their supervising faculty. Readings will be assigned from Up-To-Date regarding specific conditions encountered. Students report at 7:00 a.m. Monday-Friday and maximum time expectation is 30 hours per week.

Section 8 Breast Cancer

Under the supervision of West Michigan Cancer Center faculty, students will gain a basic understanding of the presentation, diagnosis, and treatment of breast cancer. Students will work alongside faculty in radiation oncology, medical oncology, and breast clinic. Readings will be assigned from Up-To-Date and NCCN guidelines. Students report at 7:00 a.m. Monday-Friday and maximum time expectation is 30 hours per week.

Section 9 GYN Oncology

Under the supervision of Drs. Angela Caffrey and Anna Hoekstra, students will gain a basic understanding of the diagnosis and treatment of cancer of the female reproductive tract. Readings will be assigned from Up-To-Date regarding at least one type of GYN cancer. Students report at 7:00 a.m. Monday-Friday and maximum time expectation is 30 hours per week.

Section 10 Inpatient Hematology/Oncology

Under the supervision of Drs. Linda Grossheim, Jeffrey Radawski, and Daniel Schroyer, students will be introduced to general principles of radiation oncology. They will gain a basic understanding of treatment planning, dosimetry, and the general side effects of radiation therapy. Students will attend Tumor Conferences. Readings will include relevant Up-To-Date articles and NCCN guidelines. Students report at 7:00 a.m. Monday-Friday and maximum time expectation is 30 hours per week.

Section 11 Introduction to Radiation Oncology

Under the supervision of Drs. Linda Grossheim, Jeffrey Radawski, and Daniel Schroyer, students will be introduced to general principles of radiation oncology. They will gain a basic understanding of treatment planning, dosimetry, and the general side effects of radiation therapy. Students will attend Tumor Conferences. Readings will include relevant Up-To-Date articles and NCCN guidelines. Students report at 7:00 a.m. Monday-Friday and maximum time expectation is 30 hours per week.

Section 12 Dermatology

This one week elective serves as an exploratory introduction to the practice of dermatology. Students will see a broad range of dermatology patients in an outpatient setting along with dermatologists, other physicians and physician extenders. Total contact time will approximate 30 hours per week.

Objectives:

- Discuss key questions that make up a dermatologic history
- Explain the indications for a total body skin exam
- Recognize the need for patient comfort and modesty during this examination
- List tools that can improve the quality of your skin examination
- Understand skin functions and how relevant dysfunction contributes to disease
- Develop a systematic approach to the total-body skin exam
- Develop a systematic approach to describing skin eruptions
- Estimate the amount of topical medication needed for therapy based on frequency of application and body surface area involved
- List the side effects of prolonged use of topical steroids
- Discuss the basic principles of topical antifungals, oral antihistamines and topical psoriasis medications
- Identify and describe the morphology of acne and rosacea
- Explain the basic principles of treatment for acne and rosacea
- Determine when to refer a patient with acne or rosacea to a dermatologist.
- Discuss the bacterial etiologies of cellulitis and erysipelas
- Recognize clinical patterns and risk factors that suggest methicillin-resistant staphylococcus aureus (MRSA)
- Recommend initial steps for the evaluation and treatment of common cutaneous bacterial infections

Section 13 General Neurology

Students will work alongside neurology faculty in the outpatient Neurology offices of Bronson Neuroscience Center. Students will also participate in inpatient neurology consults, as available, with neurology faculty. Students will

attend all neurology conferences as available. Total time expectation is 20-30 hours.

Objectives:

Upon completion of the elective, the student will:

- Obtain a level-appropriate history from patients presenting to the neurology service
- Perform a level-appropriate exam
- List level-appropriate differential diagnoses on patients
- Recognize the presenting features of common neurologic disorders
- Demonstrate appropriate interpersonal communication skills with patients, families, and team

Section 14 Neurocritical Care

Students will rotate in the Neuro ICU of Bronson Methodist Hospital under the supervision of neurology faculty. Students will participate in multidisciplinary rounds each morning. They will respond with faculty to consultations and stroke call downs when on duty. They will attend all applicable conferences. Time expectations will be approximately 30 hours per week

Objectives:

- The student will be introduced to the basics of the neurological history and examination
- The student will begin to develop differential diagnoses for several neurologic presentations
- The student will be exposed to patients presenting with acute stroke
- Student will be exposed to patients with intracranial hypertension
- The student may be exposed to and assist with procedures such as IV placement, arterial line placement, central venous line placement, endotracheal intubation, oral sheaths, removal of sutures, and removal of intraventricular and other drains
- The student will exhibit appropriate and professional interaction with patients, families and nursing staff
- The student will learn the team approach to care for the patient and interact in a productive manner with all members of the interdisciplinary team

Section 15 Selected Topics in Medicine Physiatry

Objectives:

- Gain insights into the broad field of physiatry, specifically medical spine care,

- through reading, observation, and patient care.
- Observe and perform focused history taking and physical examination of patients presenting with spine pain.
 - Observe and learn indications for performing electrodiagnostic studies of the limbs for the spine pain population who present with peripheral pain and neurologic complaints.
 - Observe and learn indications for interventional spinal injection procedures for low back pain.

PATH 7510 Selected Topics in Pathology

Section 1 Introduction to Forensic Pathology

Students will work alongside forensic pathology faculty and staff providing forensic pathology services in a high volume medical examiner's office. Students will shadow the autopsy assistants, in house investigators, and pathologists for five days, and will also attend daily forensic pathology conferences. Total time expectations will be 20-30 hours per week.

Objectives:

Upon completion of the elective the student should develop a basic understanding of:

- The role and responsibilities of the medical examiner's office
- Deaths that are reportable to the medical examiner's office
- Case selection for direct release, external examination, limited examination, and complete autopsy
- Death certification, including the responsibility of the primary care physician

Section 2 Death Scene Investigation

In forensic medicine, we know that the autopsy begins at the scene. Students will gain familiarity with death scene investigation through reading assignments, morning meetings, mock death scene investigations, and attending death scene investigations. Along with Medical Examiner's Investigators (MEIs) and in house investigators, they will attend death scene investigations, and daily meetings with the Pathology faculty and staff to review the scene investigations from the daily case roster. Total time expectations will be approximately 20-30 hours per week.

Objectives:

The student will develop a basic understanding of:

- Cases reportable to the Medical Examiner

- Cases requiring scene investigation by the Medical Examiner's Office
- Principles of death scene investigation
- Role of members of the law enforcement team, emergency medical services and other medical care providers as well as family members and other witnesses in death scene investigation

Section 3 Autopsy Service

Alongside Pathology faculty and staff, students will observe and assist with medical examiner's office autopsies. Students will assist the autopsy technicians with tasks such as fingerprinting, toxicology specimen collection, evisceration, and preparing the body for release to the funeral home. Students will attend morning conference, observe and assist with daily postmortem examinations, and sign-out rounds for a total time expectation of approximately 20-30 hours per week.

Objectives:

The student will develop basic understanding of the:

- Indications for postmortem examination (view, external examination, limited examination, complete autopsy)
- Evisceration technique
- Evidence, toxicology specimen, and histology specimen collection
- Indications for special dissections

Section 4 Forensic Pathology Consultants

Alongside clinical staff from clinical labs and criminalistics, the student will become familiar with the referral laboratories that produce the reports used to assist the forensic pathologist in reaching conclusions regarding cause and manner of death. This includes rotations with anthropology, the histology lab, core laboratory (including chemistry and microbiology), and spending a half day with the Kalamazoo Sheriff's Office Crime lab for a total time expectation of approximately 20-30 hours per week.

Objectives:

Upon completion of the elective the student should:

- Develop and demonstrate an understanding of the indications of additional studies
- Describe and adhere to appropriate use of additional tests
- Maintain professional and positive relations with referral labs and law enforcement

Section 5 Cause of Death, Manner of Death, and Beyond

Alongside the pathology faculty, students will assimilate all the components of the postmortem examination, from the death scene investigation to assimilating the autopsy findings with ancillary tests to arrive at a cause and manner of death. Students will be given a sample case to work through and generate their own sample autopsy report. Students will present their case at consensus conference, with a full oral presentation of how they have arrived at their final anatomic diagnoses, cause of death, and manner of death. Students will gain an understanding of the use of a forensic pathology autopsy report through attendance of death review committee meetings, attorney meetings, and accompany the pathologist in attorney meetings and court appearances, as available. Total time expectation will be approximately 20-30 hours per week.

Objectives:

The student will develop basic understanding of:

- The role autopsy reports play in public health
- The role autopsy reports play in public safety
- Role of members of the justice system team

Section 6 Forensic Pathology Research

Students with ongoing involvement in select research projects may receive permission to devote a week of dedicated time. Time expectation varies; maximum of 30 hours/week.

Section 7 Pathology and Medical History in London

This elective week occurs in London, England and includes a specially arranged opportunity to examine the hundreds of remarkably preserved human pathology specimens at the Gordon Museum, each with a provided clinical history. In addition, students will participate in educational and guided tours of the Hunterian Museum at the Royal College of Surgeons, the Old Operating Theatre, the Alexander Fleming Laboratory Museum and a visit to the Wellcome Collection. Students participating in this elective will select an applicable disease or disorder and gather literature about the selected disease before leaving for London. Upon departure for London and after studying the specimens at the Gordon Museum, the student will prepare an educational presentation to be delivered to the other students and faculty on the final day. The supervising pathology department member traveling with the students will approve the student-selected disease or disorder in advance. The specific times noted below are subject to change based on availability of access to some of the collections, which are limited to individuals in the medical community and used for teaching medical students in London.

Students are responsible for all travel, lodging and meal expenses. We hope to be able to arrange for all to stay in the same hotel and be on the same flights, but this would not be a requirement of the elective. Once we identify who will attend,

we can proceed with making final arrangements. We are partnering with the professionals at Student Universe to locate the best prices for students studying abroad.

A couple of the museums have a required fee of about \$5-10. Students should stay in the Holburn area of London. The required scheduled activities begin Monday morning and continue through Thursday at 5 PM.

Objectives:

- Recognize the gross pathological features of multiple medical conditions
- Gain an understanding of many historical aspects of medicine
- Observe changes in medical practices
- Gain familiarity with a specific condition
- Educate other students and faculty about the condition
- Gain an appreciation of advances in medical science
- Recognize variations in medical education

Section 8 Anatomic/Clinical Pathology

The student will work alongside pathologists at Bronson Methodist Hospital in the pathology office. Students will shadow pathologist in various fields for five days and will attend conferences that arise. Total expected time will be 20 – 30 hours.

Objectives:

By the end of this elective the student will be able to:

- Understand the role and responsibilities of pathologists
- Differentiate between anatomic pathology and clinical pathology
- Understand how pathologists gather information to provide a diagnosis
- Observe and describe gross findings in organs

PEDS7510 Selected Topics in Pediatric and Adolescent Medicine

Section 1 General Pediatrics Clinic

Students will work alongside departmental faculty and supervising residents caring for pediatric patients in the Department's Pediatric Clinic. Students will attend morning report with the faculty & residents and then attend in the pediatric clinic from 9:00-5:00. Total time expected is 20-30 hours per week.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- Normal growth patterns in children
- Tanner Stage in adolescents
- Recommended immunizations in Children and Adolescents

Section 2 Eating Disorders Clinic

Students will work alongside Vinay Reddy MD, the Department's Director of Eating Disorders Program. Students will attend morning report with the faculty & residents and the student will work with Dr. Reddy in both the outpatient and inpatient setting. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- DSM-5 Definition of Anorexia Nervosa
- DSM-5 Definition of Bulimia Nervosa
- Pathophysiology of eating disorders in adolescents

Section 3 Pediatric Endocrinology and Diabetes Mellitus Clinic

Students will work alongside Martin Draznin MD, the Department's Director of Pediatric Endocrinology. Students will attend morning report with the faculty & residents and will work with Dr. Draznin in both the outpatient and inpatient setting. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- Current definition of diabetes mellitus in pediatrics
- Pathophysiology of diabetes mellitus in children and adolescents

Section 4 Pediatric Pulmonary Clinic

Students will work alongside Myrtha Gregoire-Bottex MD, the Department's Director of Pediatric Pulmonology. Students will attend morning report with the faculty & resident; they will work with Dr. Gregoire-Bottex in both the outpatient and inpatient setting. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- Current definition of asthma
- Pathophysiology of asthma in children and adolescents

Section 5 Pediatrics: Contraception in Adolescents

Students will work alongside Colleen Dodich MD (the Department's Director of Pediatric Gynecology) and colleagues in the outpatient Pediatric Clinic at WMED. Students will attend morning report with the faculty & residents. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will:

- Develop a basic understanding of contraception in adolescents:
- Methods of contraception available to sexually active adolescents
- Contraindications to contraceptives in sexually active adolescents

Section 6 Pediatrics: Overweight and Obesity in Children and Adolescents

Students will work alongside faculty and supervising residents in the outpatient Pediatric Clinic at WMED. Students will attend morning report with the faculty & residents. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- Current definition of overweight and obesity in children and adolescents
- Understanding of complications resulting in pediatric obesity

Section 7 Pediatric Developmental-Behavioral Clinic

Focus on ADHD. Students will work alongside Dilip R. Patel MD and Helen D. Pratt PhD and colleagues in the outpatient Pediatric Clinic at WMED. Students will attend morning report with the faculty & residents. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- DSM-5 definition of attention deficit hyperactivity disorder (ADHD)
- Current tools used for ADHD diagnosis in the pediatric clinic
- Differential diagnosis of ADHD in children & adolescents

Section 8 Pediatrics: Focus on Medical Writing

Students will work alongside Donald E. Greydanus MD and Dilip R. Patel MD in the WMED Department of Pediatric and Adolescent Medicine. The student will attend morning report with the faculty & residents. The student will prepare an article of 3-6 pages (double-spaced, font 12) on adolescent medicine which, if accepted, will be published in the American Academy of Pediatrics Section on Adolescent Health Newsletter which has been published twice a year since 1980. Dr. Greydanus is the newsletter's editor and has developed a "Medical Student" section in this newsletter. Total time expected is 20-30 hours.

Objectives:

Upon completion of the elective the student will develop a basic understanding of:

- Importance of medical writing for physicians
- Development of a topic in adolescent medicine for publication
- Utilization of literature searches for paper preparation (WMED Librarians)
- Completion of a paper suitable for publication

PSYC 7510

Section 1 Inpatient Adult Psychiatry

Students work directly with psychiatry faculty, residents, and a multi-disciplinary team in an inpatient adult setting. Students assist in patient evaluation and management through their hospitalization. Students attend weekly psychiatry conferences, and total time expectation is 25-30 hours per week.

Objectives:

- Assist in conducting evaluations of newly admitted patients.
- Participate in discussions regarding the diagnosis and treatment plan for patients with various common psychopathologies
- Gain exposure to basic pharmacology of commonly used psychotropic medications.
- Gain exposure to the management of patients with a variety of psychopathologies
- Gain exposure to the satisfactions and challenges of the practice of psychiatry

Section 2 Inpatient Adolescent Psychiatry

Students participate in the adolescent inpatient and partial hospitalization programs at Borgess Medical Center, working with child and adolescent psychiatrists, psychiatry residents, and other professionals of the treatment team. Students are exposed to a variety of activities, such as psychological testing,

group therapy, individual therapy, family therapy, and activities therapy. Students attend weekly psychiatry conferences, and total time expectation is 25-30 hours per week.

Objectives:

- Assist in the evaluation of newly admitted adolescents.
- Gain understanding of the family and community resources available to patients
- Participate in discussions of common psychiatric disorders in children and adolescents
- Gain exposure to basic pharmacology of commonly used psychotropic medications
- Observe individual and family therapy sessions
- Gain exposure to the satisfactions and challenges of the practice of child and adolescent psychiatry

Section 3 Inpatient Geriatric Psychiatry

Students work directly with psychiatry faculty and residents, and a multi-disciplinary team in an inpatient setting with older adults. Students assist with patient evaluation and management. Students attend weekly psychiatry conferences, and total time expectation is 25-30 hours per week.

Objectives:

- Assist in evaluating older adults with psychiatric presentations
- Gain awareness of the contributions of medical illness and medications to psychiatric presentations
- Gain exposure to the use and results of psychometric screening instruments
- Gain exposure to family and community resources available to patients
- Gain exposure to common neuropsychiatric disorders
- Gain basic awareness of pharmacologic and non-pharmacologic approaches to manage behavioral problems in the older patient

Section 4 Hospital Consultation Psychiatry

Students work directly with psychiatry faculty and residents performing psychiatric evaluations of patients on hospital medical/surgical services referred for psychiatric consultation. Students also attend weekly psychiatry conferences, and total time expectation is 25-30 hours per week.

Objectives:

- Be exposed to the assessment of patients with common psychiatric referral problems.
- Gain a basic understanding of the role of the consultation psychiatrist
- Gain basic understanding of the role of drug interactions, adverse side effects and poly-pharmacy in psychiatric presentations.
- Gain exposure to cognitive assessments of delirium and dementia

RAD 7510 Selected Topics in Radiology

Section 1 Interventional Radiology

Student will work alongside interventional radiologists, midlevel providers and other departmental staff to be introduced to the practice of Interventional Radiology. The student will observe interventional radiology procedures, and assist, as appropriate. The student will attend any applicable conferences during his/her elective week. Total time expectations will be 25-30 hours per week.

Objectives:

Upon completion of the elective the student should:

- Understand the interventional radiologist's role in the healthcare team
- Demonstrate understanding of the principles of mutual respect, honesty, and discretion in the use of patient clinical and imaging data, as a part of the clinical radiology team, and when interacting with other staff.
- Gain a basic understanding of the risks, benefits, limitations and indications for common IR procedures.
- Learn how different imaging modalities are used to guide procedures and begin to understand when each is used (ultrasonography, fluoroscopy, CT).
- Explain a basic understanding of the indications and techniques of common IR procedures:
- Understand basic methods used to reduce radiation dose during IR procedures

SIM 7510 Selected Topics in Medical Simulation

Section 1 Medical Simulation

This elective is designed to provide students additional exposure and experience in performing a variety of common medical procedures, using the educational resources of WMed's Library and Simulation Center. Students will learn about, perform, practice and demonstrate student proficiency in five selected medical procedures, chosen from:

LMA use
Cricothyrotomy

Dental blocks
Eye irrigation
Coaptation splint
Long arm splint
Long leg splint
Short arm splint
Short leg splint
Sugar tong splint
Thumb spica splint
Ulnar gutter splint

Education will be on-line via WMed's access to Procedures Consult. Students may elect to repeat the elective once to gain experience with different procedures. Time expectations are estimated to total approximately 25-30 hours/week.

Objectives: Students completing this elective will demonstrate knowledge of the indications, contraindications, complications, relevant anatomy, equipment needed, steps to perform and post-procedural care related to the five procedures selected.

SURG 7510 Selected Topics in Surgery

Section 1 Surgical Subspecialties

Orthopaedic Surgery: SURG 7510/Section 1A
Thoracic Surgery: SURG 7510/Section 1B
Trauma Surgery: SURG 7510/Section 1C
Vascular Surgery: SURG 7510/Section 1D
General Surgery: SURG 7510/Section 1E
Pediatric Surgery: SURG 7510/Section 1F

For students interested in surgical subspecialties, students will spend one on one time with faculty in a particular specialty. This will include operative and office time for a total time expectation of approximately 20-30 hours per week. Students will also attend weekly surgery department conferences.

Objectives:

The student will develop basic understanding of:

- Basic disease processes in specialty
- Path to matching in specialty
- Research opportunities

Clinical Applications Clerkships – Year 3

The third year curriculum includes eight-week clerkships in the traditional disciplines of Family Medicine, Internal Medicine, Women's Health, Pediatrics,

Psychiatry/Neurology, and Surgery. Students rotate through a series of six, eight-week clerkships, experiencing both inpatient and outpatient settings. The clerkships are designed to provide exceptional clinical exposure in a wide variety of settings. During these clerkships students immerse themselves into the clinical environment, taking on specific responsibilities as a valued member of the healthcare team, while being supervised at all times.

The WMed third year curriculum includes a number of innovations designed to optimize the students' experience and provide an excellent foundation for future growth as a clinician. Two of these innovations are the Preparatory Week and the Summary and Assessment Week that flank each six-week clinical experience. The Preparatory Week is designed to optimally prepare the student to excel in the specific clinical setting for the discipline. The Summary and Assessment Week focuses on synthesizing the key knowledge and skills learned during the clerkship and include formative and summative assessments. During both these weeks, one day is dedicated to interdisciplinary activities in which students from all clerkships come together for a joint educational experience in an overarching topical area.

MED 8110 Medicine (8 credits)

Upon completion of the Internal Medicine Clerkship the third year student shall be able to:

- Obtain an accurate focused medical history of an adult patient.
- Complete an accurate focused physical examination of an adult patient.
- Formulate a differential diagnosis and a diagnostic plan from the history and physical findings of an adult patient.
- Make an oral presentation and write a note after interviewing and examining a patient.
- Interpret the results and know the indications and risks of common tests for adult patients.
- Develop appropriate therapeutic plans for active problems in adult patients.
- Implement appropriate therapeutic plans for active problems in adult patients.
- Demonstrate the learning skills and ability to identify and meet emerging information needs for diagnosis, prognosis and treatment of adult patients.
- Demonstrate behaviors consistent with the highest standards or professionalism and medical ethics in all patient encounters.
- Demonstrate skills for coordination of care and communication with colleagues.
- Demonstrate the knowledge required to provide care for adult patients.
- Demonstrate effective communication strategies with patients, families, and all members of the health care team (including physicians and non-physician health professionals).

- Demonstrate professional behaviors when interacting with patients, families, and all members of the health care team (including physicians and non-physician health professionals).

* Adapted from Yale University School of Medicine's reduced version of the Clerkship Directors in Internal Medicine/ Society of General Internal Medicine objectives.

SURG 8110 Surgery (8 credits)

Upon completion of the Surgery Clerkship the third year student shall be able to:

- Acquire History and Physical Exam skills, which lead to accurate assessment and planning of Surgical Care.
- Demonstrate competent skill in basic surgical techniques knowing the proper application of those skills.
- Describe common disease processes in standard treatments that include common core surgical considerations.
- Develop knowledge, skills, attitudes and behaviors toward learning, which perpetuate lifelong learning, inquisitiveness and evidence-based practice.
- Communicate with peers, mentors and allied health care personnel in an effective and professional manner.
- Collaborate with peers, mentors and allied health care personnel in an effective and professional manner.
- Describe typical postoperative care, including common complications of common core procedures.
- Discuss the roles of medical students on the Surgery Clerkship and the role of Surgeons in health care delivery.

* Adapted from the University of Kansas School of Medicine's reduced version of the Association for Surgical Education's objectives.

PEDS 8110 Pediatric and Adolescent Medicine (8 credits)

By completion of the Pediatric and Adolescent Medicine Clerkship the third year student will:

- Demonstrate knowledge of growth and development (physical, physiologic and psychosocial) and of its clinical application from birth through adolescence.
- Acquire knowledge necessary for diagnosing and initiating management of common pediatric acute and chronic illnesses.
- Demonstrate an understanding of the approach of pediatricians to the health care of children and adolescents.
- Demonstrate an understanding of the influence of family, community and society on the child in health and disease.
- Develop communication skills that facilitate the clinical interaction with children, adolescents and their families and thus ensure complete and accurate data are obtained.
- Develop competency in the physical examination of infants, children and adolescents.
- Develop clinical problem-solving skills.

- Develop and discuss strategies for health promotion as well as disease and injury prevention, including but not limited to the role of immunizations in prevention.
 - Develop attitudes and professional behaviors appropriate for clinical practice.
- * Adapted from the Council On Medical Student Education in Pediatrics.

FMED 8110 Family and Community Medicine (8 credits)

Upon completion of the Family and Community Medicine Clerkship the third year student shall be able to:

- Discuss the principles of family medicine care and the critical role of family physicians within any health care system.
- Gather information, formulate differential diagnoses, and propose plans for the initial evaluation and management of patients with common presentations.
- Manage follow-up visits with patients presenting with one or more common chronic diseases.
- Develop evidence-based health promotion and disease prevention plans for patients of any age or gender including education, risk reduction and health enhancement strategies.
- Demonstrate competency in advanced elicitation of history, communication, physical examination, and critical thinking skills.

* Adapted from the Society of Teachers of Family Medicine.

OBGY 8110 Women's Health (8 credits)

Upon completion of the Women's Health Clerkship, the third year student shall be able to:

- Discuss how women's reproductive function impacts all of health and disease, including how other diseases impact reproductive function in women.
- Develop competence in the medical interview and physical examination of women, incorporating ethical, social and diversity perspectives to provide culturally competent health care.
- Apply recommended prevention strategies to women throughout the lifespan.
- Explain the normal physiologic changes of pregnancy including interpretation of common diagnostic studies.
- Describe common problems in obstetrics.
- Demonstrate knowledge of intrapartum care of the mother and newborn.
- Demonstrate knowledge of postpartum care.
- Describe menstrual cycle physiology, discuss puberty and menopause and explain normal and abnormal bleeding.
- Describe the etiology and evaluation of infertility.
- Develop in-depth knowledge of contraception, including sterilization and abortion.
- Demonstrate knowledge of common benign gynecological conditions.
- Formulate a differential diagnosis of the acute abdomen and chronic pelvic pain.

- Describe common breast conditions and outline the evaluation of breast complaints.
- Demonstrate knowledge of perioperative care and familiarity with gynecological procedures.
- Describe gynecological malignancies including risk factors, signs and symptoms and initial evaluation.
- Provide a preliminary assessment of patients with sexual concerns.
- Discuss common ethical issues that arise in the provision of reproductive health care to women.

* Adapted from the Association of Professors of Gynecology and Obstetrics.

PSYC 8110 Psychiatry and Neurology (8 credits)

Upon completion of the Neurology component of the Psychiatry/Neurology Clerkship the third year student shall be able to:

- Examine patients with altered level of consciousness or abnormal mental status and identify grossly abnormal findings.
- Deliver a clear, concise, and thorough oral presentation of a neurologic patient's history and examination.
- Prepare a clear, concise, and thorough written presentation of a neurologic patient's history and examination.
- Perform a lumbar puncture on a task trainer demonstrating proper aseptic and procedural technique.
- Recognize symptoms that may signify neurologic disease (including disturbances of consciousness, cognition, language, vision, hearing, equilibrium, motor function, somatic sensation, and autonomic function).
- Distinguish normal from abnormal findings on a neurologic examination.
- Localize the likely site or sites in the nervous system where a lesion could produce a patient's symptoms and signs.
- Formulate a differential diagnosis based on lesion localization, time course, and relevant historical and demographic features.
- Discuss the use and interpretation of common test used in diagnosing neurological disease.
- Demonstrate awareness of the principles underlying a systematic approach to the management of common neurologic diseases (including the recognition and management of situations that are potential emergencies, including, but not limited to stroke, seizures, and meningitis).

* Adapted from the American Academy of Neurology, Association of University Professors of Neurology, and American Neurological Association.

Upon completion of the Psychiatry component of the Psychiatry/Neurology Clerkship the third year student shall be able to:

- Conduct a complete psychiatric history and examination.

- Recognize the importance of historical data from multiple sources including family members, healthcare providers, spiritual leaders, old records, child's teachers, indigenous and complementary providers, etc.
- Interpret historical data obtained from multiple, relevant sources.
- Discuss signs and symptoms of psychiatric disorders.
- Perform the components of the comprehensive Mental Status Examination.
- Describe common abnormalities, including their causes, for each component of the Mental Status Exam.
- Perform common screening exams for common psychiatric disorders.
- Discuss assessing patients who may be at risk for harm to themselves or others.
- Demonstrate an effective repertoire of interviewing skills including engaging and putting patients at ease, and avoiding common pitfalls.
- Provide appropriate follow up on patient's clinical progress.
- Discuss the common methods of various psychotherapies.
- Discuss common therapeutics, including the indications, contraindications, basic mechanism of action, and side effects of psychotropic medications.
- Discuss ethical principles in the care of psychiatric patient's including respect for patients autonomy and confidentiality.
- Discuss relevant legal issues such as capacity evaluation, civil commitment and the process of obtaining a voluntary and involuntary treatment.

* Adapted from the Association of Directors of Medical Student Education in Psychiatry.

Clinical Applications Clerkships and Courses – Year 4

TRAN 9100 USMLE Preparation and Examination (1 credit)

USMLE Preparation and Examination includes comprehensive preparation for USMLE Step 1, USMLE Step 2 CK, and USMLE Step 2 CS. Students participate in informal group activities, as well as customized reviews based on each student's needs. Students take the USMLE Step 1 examination during this course, scheduled on their own, and also take the Comprehensive OSCE examination by the medical school during the last week of the course in preparation for USMLE Step 2 CK.

FMED, MED, or PEDS 9210 Ambulatory Elective (4 credits)

Senior Ambulatory Care Course is a four-week outpatient experience in Family Medicine, Internal Medicine, or Pediatrics. During this experience students are expected to function at an intern level. They are assigned new and returning patients for initial and ongoing care. Students typically present cases to senior residents or attending physicians and are responsible for obtaining histories, performing physical examinations, ordering diagnostic studies, performing or assisting in procedures under supervision, making appropriate referrals, writing prescriptions

MED, PEDS, or SURG 9510 Inpatient Advanced Hospital Medicine (4 credits)

Advanced Critical Care Selective may be in Internal Medicine, Pediatrics, or Surgery. Students are assigned to an inpatient team and round on patients and take overnight call as would any first year resident. Activities during sub-internships typically include performing admission history and physicals, writing initial admitting orders, obtaining and analyzing results of diagnostic studies, writing daily progress notes, communicating with consultants, performing appropriate procedures, serving as principal presenter during daily team rounds, coordinating discharge planning, and writing discharge instructions and prescriptions.

MED, PEDS, or SURG 9520 Advanced Critical Care (4 credits)

Advanced Critical Care Selective provides experience in caring for critically ill or injured patients. Students may choose from one of the following critical care rotations: Medical Intensive Care Unit, Trauma/Surgical Intensive Care Unit, Pediatric Intensive Care Unit, or Neonatal Intensive Care Unit. This subinternship allows the student to function in the role of a first year resident to the extent possible. Students report to senior residents and/or attending physicians and are assigned to call the same as a first-year resident. Students perform initial history and physicals, write admitting and daily orders (physician co-sign required), conduct daily rounds, write progress notes, serve as primary presenter during team rounds, perform or assist with procedures under supervision, and respond to various in-house emergencies (eg, cardiac arrests, trauma alerts, high-risk deliveries).

EMER 9510 Advanced Emergency Medicine (4 credits)

Advanced Emergency Medicine Selective provides experiences with a diverse set of patients spanning all ages and experiencing many pathological conditions that present to the emergency department. Students are expected to perform the initial patient assessment, formulate a differential diagnosis and problem list, present the patient to a senior resident or attending physician, write orders, interpret diagnostic studies, discuss patients with consultants, perform or assist with procedures under supervision, write discharge instructions, and facilitate admissions and transfers.

PROF 9310 Profession of Medicine 7 (0.5 credits)

Profession of Medicine 7 is a one-week course during the spring of the fourth year of medical school, and serves as a capstone review of medical ethics. The course consists of a series of student-presented and faculty supervised clinical pathological conferences. Each presentation addresses actual medical ethical dilemmas that students have encountered during their medical school courses and clerkships. Students and faculty then lead small group discussions outlining the various ethical principles and approaches to the dilemma faced.

TRAN 9900 Transition to Residency (2 credits)

Transition to Residency provides a summation of the Clinical Applications phase of the curriculum, and is designed to ensure the preparation of graduating

students for residency. Multiple tracks are available for different specialties. It includes simulation-based experiences to provide an introduction to residency training as their next phase of medical education.