Foundations of Medicine Block Descriptions:

**Block 1: Fundamentals:** The primary goal is to establish a core knowledge base in biomedical and clinical sciences that students will build upon in subsequent blocks. Upon completing this block students will understand and apply the basic concepts of anatomy, biochemistry, cell biology, embryology, genetics, histology, microbiology, and pharmacology in the context of health and disease. In addition, students will learn about professionalism, ethics, communication, epidemiology, biostatistics, principles of evidence-based medicine, informatics, health policy, patient interviewing and physical examination.

**Block Goals:**

1. Understand basic anatomical terminology and the basic structures of the major organ systems.
2. Understand the fundamental concepts of the microscopic anatomy of the human body and describe how organ integrity and function are maintained by the organization of cells and tissues.
3. Understand the processes involved in early development of the human embryo - from zygote through implantation to formation of the body plan - and congenital malformations that arise from errors in these processes.
4. Demonstrate knowledge of the principles of genetic transmission, molecular biology of the human genome, including epigenetic mechanisms and explain how genetic variations alter the chemical and physical properties of biological systems.
5. Understand the specific types and frequencies of genetic variations and their distribution indifferent human populations and demonstrate ability to obtain and interpret family history and ancestry data to calculate risk of disease.
6. Identify appropriate indications for genetic testing; demonstrate understanding of the relevant cytogenetic techniques and recognize the limitations and implications of test results.
7. Identify the major types of biochemical molecules, including small, large and supramolecular components found in cells, understand their physical and chemical characteristics to predict normal and pathophysiological molecular function.
8. Apply knowledge of the basic principles that guide protein folding and control oligomeric assembly of protein complexes to evaluate how point mutations can alter the chemical or structural properties of proteins and cause disease.
9. Comprehend the regulation of major biochemical energy production pathways and the mechanisms by which enzymes catalyze the synthesis and degradation of molecules to explain how deficiencies in metabolic enzymes are linked to disease.

10. Use knowledge of the structure-function relationship of cellular compartments and compartment-specific intracellular trafficking pathways to explain how cellular dynamic stability is maintained and how dysregulation of cellular homeostasis is related to disease.

11. Understand how cells send, receive, and respond to signals from their environment, including other cells and explain how intra- and intercellular communication determines normal and pathogenic cell morphology, division, or survival and link these to pharmacological approaches to treat disease.

12. Distinguish the morphological and biochemical events that occur during the cell cycle and understand the mechanisms that regulate cell division and cell death to explain normal and abnormal growth and development.

13. Apply the principles of pharmacokinetics (absorption, distribution, metabolism and elimination) to evaluate options for safe, rational, and optimally beneficial drug therapy.

14. Apply knowledge of individual pharmacogenetic variability in the use and responsiveness to pharmacological agents.

15. Understand the pharmacologic key principles, targets, mechanisms, kinetics, adverse effects, interactions and contraindications, therapeutic uses and clinical effects of antimicrobial agents.

16. Understand the key principles of pharmacodynamics including drug receptors and targets, dose-response relationships, therapeutic index, drug toxicity, and drug classification based on activity.

17. Understand the role of the FDA in drug development and safety monitoring and identify reliable sources to obtain drug information.

18. Understand the key nomenclature and concepts integral to microbiology, infectious diseases, infection control and epidemiology.

19. Distinguish the structural and behavioral elements as well as the methods of survival and pathogenicity among the major groups of human pathogens.

20. Understand and identify the diagnostic techniques used to evaluate bacterial, viral and fungal pathogens.

21. Demonstrate knowledge of the basic principles of nutrition and how they relate to overall health, exercise performance and treatment of metabolic disorders.

22. Understand the fundamental types of variables and measurements along with the basic statistics used to describe them.
23. Describe the impact of environment and social determinants of health, and systems of healthcare delivery on the quality of health outcomes for individual patients and populations

24. Understand the basics of informatics and evidenced-based medicine and develop skills for critically accessing published papers and other sources of information.

25. Demonstrate the ability to acquire clinical data from multiple sources.

26. Interpret and critically evaluate clinical data from multiple sources to define clinical problems.

27. Generate a differential of diagnostic hypotheses and apply information in comparing and contrasting plausible explanations

28. Present clinical cases in oral and written forms

29. Effectively access, review, and contribute to the electronic health record for patient care and other clinical activities.

30. Demonstrate the ability to work in interprofessional teams and with patients to co-construct patient-centered clinical management plans appropriate to the defined clinical problem to achieve the triple aim of better health, better care, and lower costs.

**Block 2: Blood & Host Defense:** Students who complete this block will recognize the normal blood and immune system structure and function. They will learn about important diseases of blood and immunity including their pathogeneses, presentation, diagnostic tests and management. Students will understand and apply principles of professionalism, ethics, communication, epidemiology, bio statistics, informatics, health policy, patient interviewing and physical examination in relation to the hematologic and immunologic systems.

**Block Goals:**

1. Understand the different types of WBC, their development, morphologic characteristics, and function.

2. Distinguish innate and adaptive immunity in terms of cell types, immune-receptor specificity and diversity, kinetics, function, and role in immunological memory.

3. Describe the normal immune response to infection and vaccination including innate defense, inflammation, adaptive immune activation (B and T cells), and immunological memory; understand which immune components are most important for protection against different classes of pathogens.

4. Describe the cellular and biochemical mechanisms that underlie immunologic pathologies including autoimmunity, hypersensitivity, and immunodeficiency.
5. Understand the clinical manifestations, risk factors, and treatments (pharmacologic and biologic) for immunologic pathologies including autoimmunity, hypersensitivity, and immunodeficiency.

6. Understand the pathophysiology of inflammation.

7. Understand normal hemostasis and thrombosis, including the coagulation cascade, platelet structure and function.

8. Understand abnormal hemostasis: bleeding disorders, platelet disorders and thrombophilia and their treatments.

9. Understand normal hematopoiesis and structure and function of the major content of the RBC (i.e., RBC membrane, hemoglobin, and housekeeping enzymes).

10. Understand the major diseases of RBC: anemia (nutritional, hemolytic, and BM failure) and hemoglobin defects and their treatments (pharmacologic, nutrition, and transfusions).

11. Understand cancer biology including ideas on carcinogenesis, signaling pathway abnormalities, and basic treatment modalities: targeted therapy, chemotherapy, bone marrow transplantation.

12. Understand hematological malignancies: presentation, diagnosis and treatment; leukemias, lymphomas, myeloproliferative neoplasms and myeloma.

13. Know the important infectious diseases of blood and lymph; understand their life cycles, modes of transmission, virulence factors, clinical manifestations, and treatment modalities.

14. Demonstrate the ability to acquire data from multiple sources, to define clinical problems, to generate a differential of diagnostic hypotheses, to apply information in comparing and contrasting plausible explanations, and to present clinical cases in oral and written forms.

15. Demonstrate the ability to work in interprofessional teams and with patients to co-construct patient-centered clinical management plans appropriate to the defined clinical problem to achieve the triple aim of better health, better care, and lower costs.

16. Describe the impact of environment and social determinants of health, and systems of healthcare delivery on the quality of health outcomes for individual patients and populations.

17. Build on patient-centered communication skills, including communicating complex health information to patients using plain non-medical language, and confirming that quality communication has occurred.

18. Build on ethical principles of care, including assurance of informed consent.
Block 3: Skin, Bones & Musculature: Students who complete this block will know the structure and function of the musculoskeletal system and use that knowledge to perform a musculoskeletal examination. They will understand the approach to a patient with joint pain or rash, as well as the differential diagnosis, significance and usefulness of diagnostic tests and management strategies for these disorders. Students will understand the mechanisms underlying common musculoskeletal, skin and rheumatologic diseases. Students will apply principles of professionalism, ethics, communication, epidemiology, bio statistics, informatics, health policy, patient interviewing and physical examination in relation to the musculoskeletal, dermatologic and rheumatologic systems.

Block Goals:

1. Understand basic nerve, muscle, skin, connective tissue, bone and joint physiology and function.
2. Understand basic nerve, muscle, skin, connective tissue, bone and joint embryology and histology.
3. Understand nicotinic pharmacology and muscle excitation/contraction coupling.
4. Identify the musculoskeletal and peripheral nerve gross anatomy of the cervical and thoracolumbar spine, and the upper and lower extremities.
5. Relate your knowledge of gross anatomy to the motor and sensory function of the spine and extremities and how that influences motion.
6. Recognize deficits in function and formulate possible anatomic lesions that may account for the deficit.
7. Recognize the clinical manifestations of common nerve, muscle, skin, connective tissue, bone and joint conditions or disorders, and understand the pathophysiology that accounts for the clinical presentation.
8. Understand the epidemiology and natural history of common nerve, muscle, skin, connective tissue, bone and joint conditions or disorders.
9. Understand the clinical presentation and diagnostic approach to the patient with nerve, muscle, skin, connective tissue, bone and joint conditions or disorders, and how distinctions in presentation inform evaluation and treatment.
10. Demonstrate an appropriate spine, upper and lower extremity, skin and joint physical exam, and understand the clinical correlations of exam findings.
11. Demonstrate informed decision making regarding diagnostic tests and management plans for common nerve, muscle, skin, connective tissue, bone and joint conditions or disorders.
12. Understand the pharmacology, risks and benefits and appropriate use of non-steroidal antiinflammatories, opioids, corticosteroids, disease modifying anti-rheumatic medications, immunosuppressants, and bisphosphonates in treating common nerve, muscle, skin, connective tissue, bone and joint conditions or disorders.

13. Understand the indications, precautions and contraindications for prescribing exercise for musculoskeletal and rheumatologic conditions, and the physiologic and psychosocial benefits of exercise in treating these conditions.

14. Demonstrate the ability to acquire data from multiple sources, to define clinical problems, to generate a differential of diagnostic hypotheses, to apply information in comparing and contrasting plausible explanations, and to present clinical cases in oral and written forms.

15. Demonstrate the ability to work in interprofessional teams and with patients to co-construct patient centered clinical management plans appropriate to the defined clinical problem to achieve the triple aim of better health, better care, and lower costs.

16. Describe the impact of environment and social determinants of health, and systems of healthcare delivery on the quality of health outcomes for individual patients and populations.

**Block 4: Cardio pulmonary & Renal:** Students who complete this block will understand the structure and function of the cardiovascular, renal and pulmonary systems in health and disease, not only as individual organ systems but as they integrate in specific physiological and pathophysiological states. Students will learn to collect and interpret clinical data, and relate specific changes in these data parameters to physiological changes, which will guide the choice of therapeutic interventions. They will understand and apply principles of professionalism, ethics, communication, epidemiology, biostatistics, informatics, health policy, patient interviewing and physical examination in relation to the lung, heart and kidney organ systems, in a way that promotes the imprinting of knowledge and the curiosity to keep updating it. It is expected that during their clinical experiences and as graduate physicians the participants will have a solid knowledge base on which to continue perfecting their skills, becoming lifelong learners, who approach and treat their patients’ ailments in an efficient yet compassionate and scientifically sound manner.
Block Goals:

1. Describe the normal cardiac structure and function, and compare and contrast the structure and function of the cardiac muscle with that of skeletal and smooth muscles.
2. Recall the electrical basis of electrocardiography, develop a systematic approach to interpret an ECG, and report the appropriate pharmacologic and surgical interventions in cardiac arrhythmias.
3. Report the homeostatic regulation exerted by the autonomic nervous system and hormones over the cellular mechanisms that support normal cardiovascular function, and identify the drugs that alter this regulation.
4. Define the role feedback and feed forward mechanisms play in cardiovascular homeostasis.
5. Categorize common cardiovascular diseases such as acute coronary syndromes and ischemia, valvular disease, heart failure, cardiomyopathies and congenital heart disease by understanding their pathophysiology and how each relates to presenting symptoms and signs. Then apply a systematic way to manage them.
6. Synthesize lipid metabolism, know the common dyslipidemias and develop a systematic treatment plan that includes medications and dietary interventions to prevent obesity and coronary artery disease.
7. Develop a systematic diagnostic and management approach to peripheral vascular disease and aneurysms.
8. Describe the hemodynamic and cellular processes by which the renal tubule handles sodium, water, hydrogen ion, potassium and chloride and how these processes are regulated by nerves and hormones. Apply this knowledge to evaluate and manage patients with total body sodium/volume, water, or potassium derangements as well as acid base disorders.
9. Propose an evaluation and management plan for acute kidney injury (AKI) and chronic kidney disease (CKD), recognizing the importance of cardiovascular morbidity in the latter.
10. Contrast and compare nephritic and nephrotic syndromes in terms of diagnosis, pathophysiology, and management.
11. Learn the normal pulmonary structures and function. Describe the mechanical properties, the neural regulation of breathing, the basis for the gas exchange and the pulmonary contribution to acid base balance.
12. Understand the principles of mechanical ventilation in relation to acute respiratory syndrome and respiratory failure.
13. Understand common pulmonary diseases such as obstructive and restrictive diseases including pneumoconiosis, pulmonary embolism and pulmonary hypertension, sleep apnea, lung neoplasias and pneumonias by understanding their pathophysiology and how each relates to presenting symptoms and signs.

14. Demonstrate the ability to acquire data from multiple sources in order to define clinical problems, generate a differential diagnosis comparing and contrasting possible explanations and to present clinical cases in oral and written forms.

15. Exhibit the ability to work in interprofessional teams, and with patients to cooperatively construct patient centered management plans that are appropriate to the defined clinical problem and ultimately achieve better health, better care and lower costs.

16. Analyze the impact the environment, the social determinants of health and the systems of health care delivery have on health outcomes at individual and population levels.

**Block 5: Hormones & Digestion:** Students who complete this block will understand the structure and function of the gastrointestinal tract and the endocrine organs, with emphasis on nutrient acquisition, regulation, and interactions with endogenous regulatory molecules and microorganisms. They will know the clinical presentation of common gastrointestinal and endocrine diseases, and strategies for their management. Students will also understand and apply principles of professionalism, ethics, communication, epidemiology, bio statistics, informatics, health policy, patient interviewing and physical examination in relation to the gastrointestinal and endocrine systems.

**Block Goals:**

1. Describe the anatomy of the gastrointestinal tract and its associated organs, in addition to the diverse components of the endocrine system.
2. Understand the developmental processes giving rise to the normal gastrointestinal & endocrine systems, and aberrancies leading to abnormal form and/or function.
3. Understand the cellular structure and function of the digestive & endocrine systems.
4. Discuss the complex interrelationships of the endocrine system components and homeostatic mechanisms including positive and negative feedback signaling.
5. Differentiate between endocrine & exocrine substances in the gastrointestinal tract and understand their roles in gastrointestinal homeostasis.
6. Describe the complex interactions between microorganisms and the human organism in both symbiotic & pathologic settings.

7. Recognize the effects of nutrition on growth and development, along with disease prevention and treatment.

8. Understand processes that adversely affect gastrointestinal system function including acquisition, transit, absorption, elimination, and the common clinical manifestations of these processes.

9. Appreciate the etiologies & consequences of disruption of homeostasis in the endocrine function.

10. Identify common causes and consequences of auto-immunity in the gastrointestinal and endocrine systems.

11. Recognize how genetic variations can impact normal & pathological form and function of the gastrointestinal & endocrine systems.

12. Understand the pharmacologic principles of common medications used to treat pathologic processes of the gastrointestinal and endocrine systems.

13. Discuss non-pharmacologic treatments of pathologic processes of the gastrointestinal and endocrine systems.

14. Describe the impact of environment and social determinants on health literacy regarding nutrition, alcohol and substance abuse, healthy habits, and actual access to resources for the above.

15. Demonstrate ability to acquire data from multiple sources including patient interview, examination, EHR, diagnostic tests and scholarly resources, and apply that information in creating a differential diagnosis.

16. Demonstrate the ability to acquire data from multiple sources, to define clinical problems, to generate a differential of diagnostic hypotheses, to apply information in comparing and contrasting plausible explanations, and to present clinical cases in oral and written forms.

17. Demonstrate the ability to work in interprofessional teams and with patients to co-construct patient-centered clinical management plans appropriate to the defined clinical problem to achieve the triple aim of better health, better care, and lower costs.

18. Describe the impact of environment and social determinants of health, and systems of healthcare delivery on the quality of health outcomes for individual patients and populations.
Block 6: Nervous System & Function: Students who complete this block will have a basic understanding of the structural and biochemical foundations of neural functioning in the context of neurophysiology and neuropathology. They will identify the genetic, congenital, developmental, endogenous, and exogenous factors that influence neurologic and behavioral function. They will learn the clinical presentation, diagnostic strategy, and management of common disorders of nervous and sensory systems. Students will also apply principles of professionalism, ethics, communication, epidemiology, biostatistics, informatics, health policy, patient interviewing and physical examination in relation to neuroscience, psychiatric conditions, and the senses.

Block Goals:

1. Describe the normal development of the central and peripheral nervous system, including the molecular biology of neural tissue.
2. Describe biological and social processes involved in neurological homeostasis, including basic neuroendocrine and neuroimmunological processes.
3. Describe contribution of somatic and mitochondrial genetic disorders to major nervous system disorders.
4. Describe early life events and epigenetic mechanisms that increase the risk for nervous systems disorders.
5. Identify neural structures and neurophysiological correlates of attention, consciousness, sleep, emotion, memory, language, praxis, visuospatial function, and other higher cortical functions.
6. Describe underlying pathophysiology and localize the neuroanatomical correlates of the major congenital and acquired neurological, psychiatric, and sensory organ diseases and disorders.
7. Describe diagnostic strategies and tools for identifying the pathophysiology of the major neurological, psychiatric, and sensory organ diseases and disorders.
8. Describe the mechanisms of action of neuropharmacological treatment agents and complementary medicines, including their indications, contraindications, and major side effects.
9. Be familiar with non-pharmacologic acute and chronic treatment of major nervous system disorders, including their indications, contraindications, and major side effects.
10. Demonstrate competence and professionalism in clinical assessment by obtaining a relevant history and performing a complete physical, neurological and psychiatric examination, pertinent to presenting signs and symptoms, epidemiology and cultural contexts.
11. Demonstrate understanding of basic biostatistical strategies and informatics principles and how these can be applied to health policies and behavioral science research.

12. Demonstrate conscientious participation in the classroom and groups by attending to all duties responsibly, contributing to clinical activities, and respectfully engaging with colleagues and staff.

13. Demonstrate the ability to acquire data from multiple sources, to define clinical problems, to generate a differential of diagnostic hypotheses, to apply information in comparing and contrasting plausible explanations, and to present clinical cases in oral and written forms.

14. Demonstrate creativity in development of clinical management plans that specifically address the defined clinical problem while attending to the triple aim of better health, better care, and lower costs.

15. Describe the impact of environment and social determinants of health, and systems of healthcare delivery on the quality of health outcomes for individual patients and populations.

16. Demonstrate ability to acquire data from multiple sources including patient interview, examination, EHR, diagnostic tests and scholarly resources, and apply that information in creating a differential diagnosis.

**Block 7: Developing Human:** Students who complete this block will learn an overview of the life cycle from conception through pregnancy, childbirth, infancy, adolescence, adulthood, aging, and death. They will explore sexuality, male and female reproductive health, wellness, and reproductive pathology as well as, the presentation, clinical evaluation and management of common diseases of children and the elderly. Students will learn principles of palliative care and end of life care. Additionally, they will understand and apply principles of professionalism, ethics, communication, epidemiology, biostatistics, informatics, health policy, patient interviewing and physical examination in relation to the developing human and reproduction.

**Block Goals:**

1. To understand male and female reproductive anatomy, histology and function; and to identify the relationships between the bony pelvis, muscles, blood vessels, nerves and the reproductive organs.
2. To understand the key aspects of male and female reproductive physiology with a focus on how hormones interact to result in the menstrual cycle and spermatogenesis.
3. To relate underlying basic science concepts to the clinical aspects of reproductive and sexual health.
4. To explore issues related to reproductive and sexual health including sexual function and dysfunction; sexual pleasure, contraception, unwanted pregnancy, sexually transmitted infections, sexual orientation, gender identity, and sexual abuse/violence.
5. To understand how a new human develops; including the processes of fertilization, blastogenesis, implantation, placental development, and embryology.
6. To have a basic understanding of male and female infertility, the effect that this has on couples and the role of assisted reproductive technology to achieve pregnancy.
7. To explore the normal progression of pregnancy and childbirth and to begin to understand the etiology, diagnosis and management of related complications.
8. To understand how environmental exposure, maternal health, lifestyle choices, and medications can influence a developing fetus. To gain a basic understanding of the developmental origins of adult disease.
9. To explore issues from infancy to adolescence with an emphasis on: Well Child Care, SIDS, Vaccines, Common diseases of childhood, Developmental Milestones, Puberty, Adolescent Health, Eating Disorders, Substance abuse in adolescence, Suicide and Child Abuse.
10. To explore issues related to wellness and screening including: the use of screening tests, disease prevention, healthy lifestyle practices, the importance of family and community, environmental health and access to healthcare.
11. To understand reproductive tract pathology (breast, prostate, ovary, testicles, uterus, penis and cervix) including aspects relating to screening/diagnosis, genetics, treatment, surveillance and survivorship.
12. To explore issues related to the process of aging death and dying. To focus on the biology of aging, the effects of aging on organ systems, bone health, menopause/andropause, mental health, polypharmacy, dementia, and abuse/isolation. The importance of family and relationships, quality of life, end of life care and the process of dying will be emphasized.
13. To have a holistic and comprehensive perspective of human development and the life cycle from conception to death and to understand how each element influences the process.
14. To be able to obtain an appropriate and compassionate reproductive health related history and physical exam. To be able to discuss difficult issues related to sexual and reproductive health with patients.

15. To be sensitive to the issues surrounding childhood and geriatrics and to tailor a history and physical exam to meet these needs.

16. Demonstrate the ability to acquire data from multiple sources, to define clinical problems, to generate a differential of diagnostic hypotheses, to apply information in comparing and contrasting plausible explanations, and to present clinical cases in oral and written forms.

17. Demonstrate the ability to work in interprofessional teams and with patients to co-construct patient centered clinical management plans appropriate to the defined clinical problem to achieve the triple aim of better health, better care, and lower costs.

18. Describe the impact of environment and social determinants of health, and systems of healthcare delivery on the quality of health outcomes for individual patients and populations.

**Preceptorship and Narrative Medicine:** The preceptorship is the first clinical experience for medical students. Students who complete the preceptorship will understand and apply the basic concepts of professionalism, interpersonal and communication skills, system based practice and practice based learning and improvement. Students will also learn the basic concepts and skills of reflective practice. The overall goal is to develop proficiency in the core competencies in order to excel in the clinical clerkships.

**Goals:**

1. To interact with patients as a student-doctor.
2. To become a member of a health-care team as student-doctor.
3. To begin thinking as physicians in clinical interactions.
4. To act professionally in clinical settings.
5. To reflect on clinical experience.

**Scholarly Project:** Scholarly Projects is an in-depth investigation of topics of interest to medical students during the course of their undergraduate medical education (UME)
experiences with the goal of creating critical thinkers and lifelong learners. Students who complete Scholarly Projects will be able to think critically about complex clinical problems; expand beyond the established curriculum to investigate topics and problems in more depth; identify, define, and answer important questions relevant to clinical practice and healthcare delivery; and work effectively within a learning community. Students will also understand and apply principles of professionalism, ethics, communication, and collaboration while pursuing their projects.

**Goals:**
1. Identify an important scientific or clinical question for investigation.
2. Assess, evaluate, and apply scientific literature relevant to the question.
3. Formulate a project hypothesis based on current evidence and concepts in the field.
4. Learn appropriate approaches to addressing the question that are based on methodologic standards in the relevant fields of study.
5. Design, conduct, and interpret results of your own project based on the question and hypothesis.
6. Identify project relevance to medicine and healthcare.
7. Communicate effectively in oral and written form.
8. Apply ethics and professionalism throughout the project.