

Course Descriptions, Sequencing, and Scheduling:

Program courses are detailed below. Three courses are required foundational courses for the program:

1. Principles of Functional Medicine
2. Evidence-based Nutrition
3. Nutritional Biochemistry

Students must take the Principles of Functional Medicine course and Evidence-based Nutrition course in the first quarter of the program. The Nutritional Biochemistry course must be taken in the first two quarters of the program. All other courses (with the exception of the Final Project and Comprehensive Examination taken at the end of the program), may be taken in any sequence as long as the prerequisite foundational courses have been successfully completed. Of note, students must enroll in at least 4.5 credit hours per quarter in order to be eligible for financial aid.

The schedule of courses is designed to allow for 2 entry (admission) points each year and the possible completion of the entire program by a student taking a maximum load within 5 quarters. Because most graduate students are unlikely to take more than 8-10 credits per quarter, it is more likely that the typical student will take at least 6 quarters to complete the program. Courses will be offered frequently enough so that a student would not need to wait more than 2 quarters for required courses to be offered again. Most elective courses will be offered twice a year.

Students take 13 required courses (46 quarter credits; 506 hours) and 2 elective courses (4 quarter credits; 44 hours), for a total of 50 credits and 550 hours. A comprehensive examination is taken as part of the final required course. The Institute of Functional Medicine provides one of the required courses (Applying Functional Medicine in Clinical Practice). Student may opt to take up to 2 of the IFM's advanced practice modules to satisfy the elective courses requirement. Other elective courses are presented by UWS.

Course name	Credits (quarter)	Hours
Principles of Functional Medicine	5	55
Evidence-based Nutrition	3	33
Nutritional Biochemistry	2	22
Sports Nutrition and Fitness	3	33
Detoxification and Biotransformation Pathways and Imbalances	3	33

Supplementation and Whole Food Nutrition	5	55
Hormone and Neurotransmitter Regulation and Imbalances	4	44
Oxidative/Reductive Dynamics and Energy Production	4	44
Immune Imbalances and Inflammation	4	44
Gastrointestinal Imbalances	4	44
Structural Integrity	2	22
Fundamentals of Mind-Body Medicine and The Psychology of Well-being	1	11
Applying Functional Medicine in Clinical Practice	4	44
Final project and comprehensive examination	2	22
TOTAL REQUIRED	46	506
Elective Courses: students must complete 4 elective credit hours; additional course will be added.		
Botanical Medicine	2	22
Nutrition in Special Populations	2	22
Advanced Practices (modules from IFM; each)	2	22
Pharmacology and Drug-Nutrient Interactions I	2	22
Pharmacology and Drug-Nutrient Interactions II	2	22
Functional Medicine for Chronic Hypertension and Metabolic Syndrome (description pending)	2	22
Functional Medicine for Autoimmune Disorders (description pending)	2	22
Electives	4	44
TOTAL ALL COURSES	50	550

Required Course Descriptions:

1. Principles of Functional Medicine: This course presents the fundamental concepts of functional medicine, including genetic predisposition to illness, biochemical individuality, environmental factors (nutrition/diet, xenobiotics, exercise, physical trauma, psychosocial changes), physiologic functions and imbalances, triggers and mediators of illness, common clinical imbalances (oxidative and reductive stress, energy production, structural integrity, assimilation, immune surveillance and inflammation, other defense mechanisms, hormone and neurotransmitter regulation, detoxification and biotransformation, nutritional genomics, and the relationships of mental, emotional and spiritual elements to health and healing). The personalized, whole-person, integrated systems approach of functional medicine will be compared and contrasted to conventional approaches to healthcare. Specialized clinical assessments, diagnostic functional tests and measures/biomarkers of allostatic load will be explored, along with some of the core therapeutic approaches used in many patients. This course lays the foundation for many of the subsequent courses in this degree program and must be taken in the first quarter of the degree program. (5 credits; 55 hours)
2. Evidence-based Nutrition: This course provides a core knowledge base in evidence-based and evidence-informed healthcare, with a focus on critical appraisal of the literature in the field of clinical nutrition. Concepts covered include literature search methods, assigning levels of evidence to research studies, basic research methodologies, and the integration of using the best available research, clinical expertise, and patient values. Students learn how to locate, interpret, analyze, and apply nutritional literature to make evidence-based decisions in clinical care. Use of the major evidence-based libraries/databases relevant to nutrition and functional medicine is emphasized. The use of outcomes assessment instruments for initial screening and monitoring of specific clinical disorders is also covered. This course must be taken in the first quarter of the degree program. (3 credits; 33 hours)
3. Nutritional Biochemistry: This course provides an overview of essential concepts in human biochemistry and links those concepts to specific applications in clinical nutrition. The course will examine the biological roles of macro- and micronutrients and their metabolism using basic knowledge in physiology, biochemistry and molecular biology. Topics include carbohydrates and energy metabolism, protein and amino acids, bioactive peptides, enzymes, fiber, lipids, the arachidonic acid cascade, minerals, water-soluble and fat-soluble micronutrients, mitochondria and energy production, and biochemical individuality. Students will explore the relationships of nutrients to major health disorders, including cardiovascular disease, diabetes and cancer. This course must be taken within the first two quarters of the degree program. (2 credits; 22 hours)
4. Sports Nutrition and Fitness: This course focuses on nutrition considerations and applications in exercise, athletes, performance enhancement, and weight management. Controversial practices involving various ergogenic aids, including illicit and legally-available substances, are considered in depth. Interactions between supplements and laboratory tests in the athletic setting are reviewed. Weight management programs are compared and contrasted, and the evidence supporting various programs is evaluated. (3 credits; 33 hours)
5. Detoxification and Biotransformation Pathways and Imbalances: This course examines the metabolic pathways that are involved in the conversion of exogenous and endogenous toxins and waste compounds and molecules into excretable substances.

Hepatic and intestinal mechanisms are explored in depth, as well as detoxification reactions occurring in minor tissues. Phase I and II reactions, regulation of detoxification pathways, genetic variations, and functional assessment of these mechanisms are investigated. Nutritional support and the effect of drugs on detoxification pathways are reviewed, as well as the disturbed physiology and eventual pathology that results from imbalances in detoxification and biotransformation. (3 credits; 33 hours)

6. Supplementation and Whole Food Nutrition: This course covers concepts relating to functional foods, industrial agriculture, raw foods, cooked foods, organic foods, processed foods, synergistic interactions in whole foods, extraction and concentration of bioactive compounds from functional foods, and synthetic and “natural” supplements. Specific applications and controversies relating to use of functional foods and high-dose nutrient supplementation in the management of chronic disorders will be explored. (5 credits; 55 hours)
7. Hormone and Neurotransmitter Regulation and Imbalances: This course examines the actions, interrelationships, control mechanisms and imbalances of neurotransmitters, neuroendocrine factors, hormones and immune mediators. Particular emphasis is placed on the hypothalamic-pituitary-adrenal (HPA) axis, thyroid metabolism, and sex hormones. The effects of toxins, free radicals, stress, diet, nutrient deficiencies, digestive disorders, drugs and specific foods on neurotransmitters and hormones are analyzed. Laboratory testing of the various substances, including precursors and metabolites is included. Case studies will include anxiety, depression and other mood disorders, the metabolic syndrome, menstrual and perimenopausal disorders, chronic fatigue, and disorders secondary to adrenal or thyroid dysfunction. (4 credits; 44 hours)
8. Oxidative/Reductive Dynamics and Energy Production: This course examines the mechanisms leading to oxidative or reductive stress and the impact of those reactions on the production of chronic disease. Production of free radical and reactive oxygen species, and the nitric oxide cycle are covered in depth. Mitochondrial dysfunction and other mechanisms of abnormal energy production are reviewed. Reduction of stressors and restoration of normal oxidative/reductive homeodynamics through nutritional, emotional, lifestyle and physical interventions is explored. Controversies in use of supplemental antioxidants are discussed. Specific case studies will include cardiovascular disorders, neurodegenerative disorders, dysglycemia, and chronic fatigue. (4 credits; 44 hours)
9. Immune Imbalances and Inflammation: This course explores inflammation and immune dysfunction as common pathogenic mechanisms in many chronic disorders, such as diabetes mellitus, hypertension, allergy, and autoimmunity. Normal immune surveillance and defense systems are reviewed, and the means by which aberrancies in these systems leads to diseases are detailed. Dietary and (phyto)nutritional influences on the inflammatory process, including both pro-inflammatory and anti-inflammatory effects, are explored in depth. Case studies will include autoimmune diseases, allergies, and metabolic disorders. Risks, benefits, and nutritional interactions associated with common anti-inflammatory medications are reviewed. (4 credits; 44 hours)
10. Gastrointestinal Imbalances: This course presents an overview of the metabolism of the gastrointestinal system, with an emphasis placed on the nutritional implications of dysfunctional digestion or absorption, intestinal membrane integrity and permeability, alterations in GI microbiological flora and gut ecology, hepatoenteric cycles, hydrochloric acid and digestive enzymes, assimilation of nutrients, and the GI immune

system. Nutritional support of GI function and repair is emphasized. Case studies include inflammatory bowel diseases, irritable bowel syndrome, peptic ulcer, and gluten-sensitivity. (4 credits; 44 hours)

11. Structural Integrity: This course examines the interrelationship between structure, function, well-being and chronic pain syndromes. Structural integrity is considered throughout the spectrum from cellular membranes and receptors up through neuromusculoskeletal system and whole body structure. Somatovisceral, viscerosomatic, and mind-body interactions are explored. Nutrients closely related to membrane integrity, prostaglandins (and leukotrienes, prostanoids, resolvins, docosatrienes), transport and signaling mechanisms (such as Nk-kappaB), fluid dynamics, pain mediation, bone metabolism, and acid-base balance are discussed. Detailed orthopedic examination procedures are reviewed so that practitioners can directly assess and treat areas of dysfunction for common pain syndromes; included in this physical assessment is the “nutritional physical” by which clinicians can appreciate physical manifestations of internal imbalances and nutrient insufficiencies. (2 credits; 22 hours)
12. Fundamentals of Mind-Body Medicine and The Psychology of Well-being: This course examines the key psychological and psychosocial factors that influence health outcomes. Allostasis and allostatic load concepts relating to aging and chronic illness are discussed. Important concepts in mind-body therapies and mindfulness practices to improve biopsychosocial factors, promote psychophysiological coherence, and influence health outcomes are reviewed. (1 credit; 11 hours)
13. Applying Functional Medicine in Clinical Practice (AFMCP): This course is provided through the Institute for Functional Medicine. It is a well-orchestrated, comprehensive, patient-centered educational program that helps the practitioner deepen his/her clinical understanding and practical application of the Functional Medicine Matrix Model as applied to: GI dysfunction, the metabolic syndrome, hormonal imbalance, nutritional status, inflammation, adrenal & thyroid fatigue, orthopedic/rheumatologic conditions, therapeutic relationships, immune dysfunction, toxins & biotransformation, and food allergies. Use of outcomes assessment tools is covered in depth. This course is heavily based on actual patient cases. AFMCP is a 37.5 hour five-day course provided at various locations during the year. (4 credits; 44 hours; 37 hours provided through IFM, 7 hours of review and assessment through UWS).
14. Final project and Comprehensive Examination: This is the capstone course in the degree program and is taken concurrently with the last quarter of study or the following quarter. Each student, working with a faculty advisor, produces a literature review or case study covering one of the fundamental, core principles covered in the program. Students also complete a digital learning portfolio in which they describe, reflect on, and seek feedback on their learning experiences. This portfolio is compiled by the student throughout the degree program. A several-hour comprehensive final examination covering all aspects of the required coursework must be taken at the conclusion of this course. (2 credits; 22 hours)

Elective Courses:

1. Botanical Medicine: This course presents a practical overview of medical botany/herbology, including history, composition, safety, and therapeutic use of the most commonly used botanical medicines in pharmacognosy. Each of these agents is reviewed regarding its classification, bioactive components, herb-drug-nutrient

interactions, mechanism of action, metabolism, indications and contraindications, toxicology, methods of administration, and dosage. Common herbal combination formulations are also reviewed. (2 credits and 22 hours)

2. Nutrition in Special Populations: This course looks at nutritional needs and interventions in special populations, such as young children, the elderly, pregnant women, post-surgical patients, patients with terminal illnesses, and disabled persons who may have mental or physical conditions that affect their basic nutritional needs and their ability to utilize food normally. . (2 credits and 22 hours)
3. Pharmacology and Drug-Nutrient Interactions I: This course provides a practical overview of pharmacologic therapy used in the management of ambulatory patients with chronic illnesses or non-life threatening acute illnesses. The student will study the effects of drugs on organ systems and diseases and the mechanism of action (pharmacodynamics), the liberation, absorption, distribution, metabolism and excretion of drugs (pharmacokinetics), potential toxic effects of medications, factors affecting the effectiveness of drugs, and interactions with drugs, botanical compounds, foods, and nutritional supplements. Using a variety of patient cases, students will learn the importance of taking medication histories, how to recognize adverse drug effects and interactions, common applications, rational prescription/referral practices, and risk-benefit analysis in comparison to non-drug interventions. . (2 credits and 22 hours)
4. Pharmacology and Drug-Nutrient Interactions II: This course is the second of a 2-part series on pharmacology. It expands on the subject material presented in part I by expanding the list of drugs, examining the pharmacogenomics of medications, and using additional patient cases. (2 credits and 22 hours)
5. “Advanced Practice Modules” (APM): Students may receive 2-4 credits of elective coursework by completing 1-2 APM provided through IFM. IFM’s APMs are a series of workshops on functional medicine topics typically 18-20 hours in duration, provided at various locations during the year. Examples, which may vary, include the following:
 - a. Advanced Practice Module - “The Many Faces of Immune Dysregulation and Chronic Inflammation: Chronic Infections, Atopy and Autoimmune Disorders”. (2 credits; 22 hours; 19.5 provided through the IFM, 2.5 hours of review and assessment through UWS)
 - b. Advanced Practice Module - “Re-establishing Hormonal Balance in the Hypothalamic Pituitary, Adrenal, Thyroid and Gonadal Axis”. (2 credits; 22 hours; 19.5 provided through the IFM, 2.5 hours of review and assessment through UWS)
 - c. Advanced Practice Module “Restoring Gastrointestinal Equilibrium: Practical Applications for Understanding, Assessing, and Treating Gut Dysfunction”. (2 credits; 22 hours; 19.5 provided through the IFM, 2.5 hours of review and assessment through UWS)
 - d. Advanced Practice Module “Understanding Biotransformation and Recognizing Toxicity: Evaluation and Treatment in the Functional Medicine Model”. (2 credits; 22 hours; 19.5 provided through the IFM, 2.5 hours of review and assessment through UWS)
6. Other electives will be developed in the future by UWS.