Movement Science Course Descriptions

UPDATED 10/08/09

Prerequisites are listed *in italics.*
Terms offered are CAPITALIZED.

MOVESCI 110. Biological and Behavioral Bases of Human Movement (3). An introduction to exercise physiology, biomechanics and motor control. Students gain an appreciation of the study of human movement from a scientific perspective. **FALL/WINTER**. **Instructor(s): Drew, Katch, Anaka**

MOVESCI 230. Human Musculoskeletal Anatomy (4). This course focuses on functional anatomy of the human musculoskeletal system. Students will learn the names and major landmarks of the major bones, the structure and kinematic characteristics of the major joints, as well as the names and functions of all the major muscles in the human body. The course format includes both lecture and laboratory experiences. After taking this course, students will be able to describe human movement in anatomical terms and to identify the specific muscles responsible for controlling human movements. **FALL/WINTER**. **Instructor(s): Gross, Drew**

MOVESCI 240 / PHYSED 265. Introduction to Fitness and Health (3). Introduces fundamental theories, applications and personal experiences necessary for a comprehensive understanding of relationships between fitness and physical activity to overall health and wellbeing throughout the lifespan. This course is designed to equip students for lifelong understanding of themselves as integrated physiological, psychological and sociological entities. **FALL/WINTER. Instructor(s): Katch**

MOVESCI 241. Exercise, Nutrition and Weight Control (3). Study of body mass regulation including the understanding of food, digestion, metabolism and different intervention strategies such as diet and exercise. Students learn assessment and prescription principles and techniques. **FALL/WINTER. Instructor(s): Katch**

MOVESCI 250. Statistics (3). This course is designed to provide students with knowledge and experience with statistics and the scientific method. Frequency distributions, descriptive statistics for summarizing measures of central tendency and variability, measures of association, variance, statistics for testing hypotheses, and statistics used to evaluate validity and reliability will be emphasized. Students will participate in several lab projects requiring the use of statistics. **FALL/WINTER. Instructor(s): D. Ulrich, Esposito**

MOVESCI 280. Undergraduate Research Opportunity (1-4). *Permission of instructor; first or second year student.* The UROP program enables students to work one-on-one or with a small group of students with faculty members conducting research. Students spend on average 9-10 hours per week working on their research projects. Students receive 1 credit per 3 hours of work per week. Students participating in the program are also required to attend bi-weekly research peer group meetings, meet monthly with a peer advisor, read research-related articles (e.g., research ethics, research in specific disciplines, research methods) and keep a research journal. **FALL/WINTER. Instructor(s): STAFF**

MOVESCI 290. Field Experience in Movement Science (1-8). *Freshman, sophomore standing; permission of instructor.* Provides an opportunity for supervised observation and participation in a variety of school, university, clinical or business settings related to Movement Science. **FALL/WINTER. Instructor(s): STAFF**

MOVESCI 305. Topical Seminar (1-3). The current course description, if applicable, is available from the program chair. **FALL OR WINTER, AS ARRANGED. Instructor(s): STAFF**

MOVESCI 313. Special Topics (1-4). New courses in development can be introduced provisionally into the curriculum under this number. The current course description, if applicable, is available from the program chair. **FALL OR WINTER, AS ARRANGED.**

Fall 2009 Offering:

Section 002-005: **Scientific Writing (3). Instructor(s): Sonnega**

Winter 2010 Offerings:

Section 001-004: **Scientific Writing (3). Instructor(s): Sonnega**

Section 005: **Motion Capture and Animation for Biomechanics (3). Instructor(s): Gross**

MOVESCI 320. Motor Control (4). *MOVESCI 110; MEDADM 401 or MOVESCI 230; MOVESCI 250; PHYSIOL 201.* Introduces students to the neural and behavioral basis of motor control. It covers nervous system structures involved in planning, executing and learning movements, as well as the principles of motor control that apply to locomotion, reaching and grasping, eye movements and more complex skills. **FALL/WINTER**. **Instructor(s): Brown, Seidler**

MOVESCI 330. Biomechanics of Human Movement (4). *MOVESCI 110; MEDADM 401 or MOVESCI 230; MATH 105 or 115; PHYSICS 125, 135 or 140.* Applies fundamental biomechanical principles to the human musculoskeletal system. Topics include musculoskeletal mechanics, tissue biomechanics, and quantitative analysis of human movement. **FALL/WINTER**. **Instructor(s): Palmer**

MOVESCI 340. Exercise Physiology (4). *MOVESCI 110; MEDADM 401 or MOVESCI 230; PHYSIOL 201; MOVESCI 250; CHEM 130 recommended.* Physiological principles of exercise. Topics include: bioenergetics, energy expenditure, functions of the cardiovascular, pulmonary, neuromuscular and neuroendocrine systems, muscle, renal function, training, environmental influences, ergogenic aids, nutrition, weight control, and body composition. **FALL/WINTER. Instructor(s): Horowitz, Bodary**

MOVESCI 380. Problems in Movement Science (1-3). *Permission of instructor.* Students work with a faculty member to study the application of knowledge and principles from the Movement Sciences to specific "real-life" problems such as those found in the workplace, health care and rehabilitation, or physical performance in recreation, music and the arts. **FALL/ WINTER/ SPRING/ SUMMER. Instructor(s): STAFF**

MOVESCI 381. Community Service Learning (1-3). *Permission of instructor.* An introduction to the values of learning via community service. The academic credit is for learning not for service. The community experience ought to enhance academic learning and civic learning at the same time. This course is an experiential field course involving community service as it relates to Movement Science. Students will be assigned to work with community-based organizations on projects to improve the human well-being. Activities may include tutoring, community outreach and education, sports, arts and crafts, etc. Students meet once per week to discuss the practicum experience while integrating theory with practice. Assignments may include maintaining a journal, readings, a paper(s), or a poster/oral presentation.
FALL/WINTER. Instructor(s): STAFF

MOVESCI 382. Honors Reading (1-3). *Upper division standing; permission of instructor.* Directed readings on topics in Movement Science under the guidance of faculty. **FALL/ WINTER/ SPRING/ SUMMER. Instructor(s): STAFF**

MOVESCI 384. Honors Research (1-3). *Honors status; permission of instructor.* Research experience under guidance of faculty. **FALL/ WINTER/ SPRING/ SUMMER. Instructor(s): STAFF**

MOVESCI 390. Field Experience in Movement Science (1-8). *Upper division standing; permission of instructor.* Provides an opportunity for supervised observation and participation in a variety of school, university, clinical or business settings related to Movement Science. **FALL/WINTER. Instructor(s): STAFF**

MOVESCI 402. Teaching Experience for MOVESCI Students (1-3). *Permission of instructor; junior/senior status; minimum B+ in related MOVESCI core courses recommended.* Undergraduate students participating in this course are responsible for (1) aiding regularly assigned teaching faculty in a particular course; (2) providing tutorial help for undergraduate students enrolled in the course they are assisting in; (3) meeting regularly with discussion and/or laboratory sessions; (4) participating with teaching faculty in instructional activities. May be repeated once in a different area or with a different professor. **FALL/WINTER. Instructor(s): STAFF**

MOVESCI 403. Internship (1-4). *Upper division standing; permission of instructor.* Field experiences in activities related to the academic discipline of Movement Science. Experiences are typically outside of the facilities of the Department of Movement Science. S/U grading only. **FALL/ WINTER/ SPRING/ SUMMER. Instructor(s): Reck**

MOVESCI 421/KINESLGY 421. Disorders of Voluntary Movement (3). *MOVESCI 320 or permission of instructor.* An introduction to a variety of common diseases or conditions such as cerebral palsy, stroke, multiple sclerosis, and Parkinson's Disease which affect voluntary movement. Emphasis is placed on relating structure to function and the application of motor control principles in describing conditions characterized by sensorimotor deficits. This course will be of interest to students considering careers in neurorehabilitation or other health-related fields. **FALL OR WINTER, AS ARRANGED. Instructor(s): Brown**

MOVESCI 422/KINESLGY 422. Motor Learning (3). *MOVESCI 320 or permission of instructor.* Covers theories including conventional information, progressing theories, and connectionist (neural networks) models, theories of motor learning, the effects of different practice regimens, feedback, context and other effects of learning environments. Also considers the neural basis of motor learning and adaptation in humans. **FALL OR WINTER, AS ARRANGED. Instructor(s): STAFF**

MOVESCI 423/KINESLGY 423. Sensorimotor Development (3). *MOVESCI 320 or permission of instructor.* The purpose of this course is to study major concepts and principles fundamental to the development of sensorimotor behavior from fetal to late childhood. The overall question for this class is: How and why patterns of motor behavior change? We will study subsystems that affect behavior in real time and over developmental time. This course is intended for pediatric practitioners as well as people interested in basic science issues. We will study the origins of new motor patterns as well as the improvement of motor performance with special emphasis in the development of the nervous system from fetal to early childhood life. We will discuss observable and "classic" changes in motor skill that occur over time, and we will examine and discuss methods to assess motor performance. **FALL OR WINTER, AS ARRANGED**. **Instructor(s): B. Ulrich**

MOVESCI 424/KINESLGY 424. Human Movement & Aging: Changes in Sensorimotor Control (3). *MOVESCI 320 or permission of instructor.* This course focuses on age-related changes in human movement, particularly as they relate to upper limb control. Changes in the sensory, neuromuscular, and central neural systems will be addressed, as well as the development of adaptive strategies and the application of various therapeutic techniques to enhance motor performance. Disease conditions such as Parkinson's and Alzheimer's, commonly associated with the elderly, will also be discussed. While being primarily a survey course, recent experimental findings will be incorporated where appropriate. This course is relevant for those students considering careers in health care delivery with an emphasis on older populations. **FALL OR WINTER, AS ARRANGED. Instructor(s): Brown, Seidler**

MOVESCI 425/PHYSED 425/KINESLGY 425. Motor Behavior and Developmental Disabilities (3). *Junior or senior standing.* This course is designed to provide students with a thorough understanding of the factors that contribute to the motor behavior characteristics of children with developmental disabilities. Application of this knowledge to designing and implementing quality pediatric motor development and physical activity programs will be emphasized. A research-to-practice model will be employed. Students will learn how to assess the current level of movement skill development. **FALL/WINTER. Instructor(s): D. Ulrich, MacDonald**

MOVESCI 426. Cognitive Neuroscience of Action (3). *MOVESCI 320.* This course focuses on the neuropsychology of movement. Topics include: handedness, reading, motor timing, skill acquisitions and bimanual coordination. We will discuss both the strategies used to control these behaviors, and their underlying neural substrates. We will read and discuss papers that analyze movement kinematics, as well as function neuroimagining and neural recording research. **FALL, AS ARRANGED. Instructor(s): Seidler**

MOVESCI 429/KINESLGY 429. Laboratory Rotation in Motor Control (1-3). *MOVESCI 320; permission of instructor.* Students work in a professor's laboratory to learn research methods and participate in the scientific process. May be taken twice. **FALL/WINTER/SPRING/SUMMER, AS ARRANGED**. **Instructor(s): Brown, Seidler, B. Ulrich, D. Ulrich**

MOVESCI 435. Biomechanics of Human Locomotion (3). *MOVESCI 330 or permission of instructor.* The focus of the course is on understanding how humans walk and run. Topics will include kinematics, kinetics, neuromuscular activation patterns, energetics, and musculotendon mechanics. This course is taught in a Problem-Based Learning format, requiring students to integrate knowledge of muscle physiology, neuroscience, and biomechanics to analyze normal and pathologic human locomotion. Specific projects that students may work on include clinical gait analysis, lower limb prostheses, legged robots, and human exoskeletons. **FALL, AS ARRANGED. Instructor(s): Ferris**

MOVESCI 439/KINESLGY 439. Laboratory Rotation in Biomechanics (1-3). *MOVESCI 330; permission of instructor.* Students work in a professor's laboratory to learn research methods and participate in the scientific process. May be taken twice. **FALL/ WINTER/ SPRING/ SUMMER. Instructor(s): Ferris, Gross, McLean, Palmer, Palmieri-Smith**

MOVESCI 441/KINESLGY 441. Exercise and Human Biology (3). *MOVESCI 340 or permission of instructor.* Emphasizes an integrative view of exercise physiology that includes discussion of the neuroendocrine control mechanisms in homeostatic functions and in the adaptive responses of an organism to the challenge of exercise. **FALL OR WINTER, AS ARRANGED. Instructor(s): Borer**

MOVESCI 442/KINESLGY 442. Hormones and Exercise (3). *MOVESCI 340 or permission of instructor.* Review of the mechanisms of hormone release and hormone action; examination of the effects of different types of acute exercise (high resistance, intermittent, endurance), and of the adaptation to habitual exercise on release of endocrine paracrine, and autocrine humoral agents and the functional significance of such release. **FALL OR WINTER, AS ARRANGED. Instructor(s): Borer**

MOVESCI 443/KINESLGY 443. Human Movement and Aging: Hormones and Nutrition (3). *MOVESCI 340 or permission of instructor.* This course will address the interactions between nutrition, hormones, physical activity, and aging. The major themes of the course are the involvement of endocrine changes in disabilities associated with aging, contribution of sedentary lifestyle, and inappropriate food intake to the development of these disabilities, and the extent to which exercise can reverse them. In addition, the course will examine the role of hormones in

psychological and mental well-being and the capacity of exercise to facilitate these endocrine changes. **FALL OR WINTER, AS ARRANGED. Instructor(s): Borer**

MOVESCI 449/KINESLGY 449. Laboratory Rotation in Exercise Physiology (1-3). *MOVESCI 340; permission of instructor.* Students work in a professor's laboratory to learn research methods and participate in the scientific process. May be taken twice. **FALL/WINTER/SPRING/SUMMER. Instructor(s): Bodary, Borer, Cartee, Horowitz, Katch, Mendias**

MOVESCI 471/KINESLGY 471. Physical Activity, Health and Disease (3). *MOVESCI 340 or permission of instructor.* Students examine current social trends and policies related to the role exercise plays in maintaining health and wellness. Covers cardiovascular disease, lower back pain, obesity and weight control, muscular strength and endurance, mental health and stress, aging, longevity and quality of life. **FALL OR WINTER, AS ARRANGED. Instructor(s): Borer**

MOVESCI 474. Worksite Wellness (3). *MOVESCI 340 or permission of instructor.* Explores the concept of health behaviors and the prospective view of health risk and costs. Students will see how physical activity is integrated into a healthy lifestyle and how that benefits individuals, organizations and society. Examines strategies for changing employee health behaviors and worksite cultural norms, as well as implementation, marketing, cost-effectiveness and cost-benefit analysis of worksite wellness programs. **FALL OR WINTER, AS ARRANGED**. **Instructor(s): Edington**

MOVESCI 488. Independent Study (1-3). *Junior standing, permission of instructor.* Students work with an individual professor on a mutually agreed-upon project that may include readings, research or other academic experience. **FALL/WINTER/SPRING/SUMMER**. **Instructor(s): STAFF**

MOVESCI 489. Senior Thesis (2-5). *Senior standing; permission of instructor.* This research involvement typically spans at least two semesters and should involve a literature review of the research topic, data collection, analysis, and interpretation. The literature review, data, and interpretation of the research findings will be incorporated into a final written report, which will be assessed by the faculty mentor. The faculty mentor will determine specific details of the research experience. **FALL/WINTER/SPRING/SUMMER. Instructor(s): STAFF**

MOVESCI 490. Senior Honors Thesis A (1-5). *Senior standing, honors status, permission of instructor.* Students work with a professor to prepare an original research paper that includes a proposal, data collection and written article. **FALL/WINTER/SPRING/SUMMER. Instructor(s): STAFF**

MOVESCI 491. Senior Honors Thesis B (1-5). *Senior standing, honors status, permission of instructor.* Students work with a professor to prepare an original research paper that includes a proposal, data collection and written article. Total credits for MOVESCI 490 and 491 cannot exceed 5. **FALL/WINTER/SPRING/SUMMER. Instructor(s): STAFF**