Neuromotor Science (NMS)

Course information contained within the Bulletin is accurate at the time of publication in August 2023 but is subject to change. For the most up-to-date course information, please refer to the Course Catalog.

NMS 9621. Neuromotor Science 1: Neural Factors. 3 Credit Hours.
Current theories and research pertaining to the neural mechanisms underlying motor control, sensorimotor integration and motor learning will be introduced as a foundation for understanding functional movement and motor deficits. The roles of selected brain regions as they relate to different aspects of motor behavior will be discussed. Lesions studies will be presented to further demonstrate the impact of neural impairments on movement performance and motor learning. Application of neurophysiologic methods that evaluate the relationship between neural circuitry and human movement (e.g., EMG, MRI, PET, EEG, TMS) will be discussed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9622. Neuromotor Science: Instrumentation. 3 Credit Hours.
Instrumentation is an introduction to electrical components and circuits, and their role in the function of laboratory instrumentation. The main goal of this class is to develop the student's competence in managing the instrumentation and the quality of resultant data for motion analyses through an understanding of data acquisition equipment that is appropriate to their chosen research area. The student will be exposed to basic electronic design of filters, amplifiers, and A/D sampling as well as selected pieces of laboratory instrumentation. The class is organized in a lecture/lab structure.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9623. Neuromotor Science: Programming. 3 Credit Hours.
This course is designed for students with little to no programming skills to help them with a general understanding of computer hardware, software, and the interaction between the two. Factors that make the use of the computer useful to neuromotor research will be presented. Basic computer architecture and operating systems will be discussed in this class. The student will gain a basic understanding of software programming logic and structures as well as signal processing techniques for analysis of human movement data. The goal of this course is for students to gain skills in basic programming for scientific data analysis of time series data with Matlab. In addition, students will also be exposed to software packages commonly used for movement analysis such as LabView, C, Visual-3D, and OpenSIM. The class is organized in a lecture/lab structure.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9624. Neuromotor Science 2: Mechanics and Models. 3 Credit Hours.
Application of mechanical principles to static and dynamic models of human posture and movement and of the mechanical properties of the link-segment systems and biological tissue are introduced in this course. Theoretical frameworks, computational, and statistical models (e.g., dynamical systems, equilibrium point, control theory, and Bayesian) are introduced as a basis for understanding the organization of complex movement patterns. Interpretation of the model predictions is based on both healthy individuals and those with movement deficits. The first half of the course will focus on the development of the tools necessary to conduct biomechanics research, process the data, and perform biomechanical data analysis. The second half of the course will work through common biomechanics questions related to human movement in three dimensions.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9627. Neuromotor Science 3: Cognition and Learning. 3 Credit Hours.
This course focuses on current theories and research related to cognitive and learning processes that influence motor behavior. Objectives include examination of lifespan motor development and learning, attentional mechanisms, perceptual effects on motor output, implicit and procedural memory effects on motor control, automatic compensatory responses and/or strategies following injury or disease, and the factors that influence adaptation and learning to long- and short-term changes in the body or environment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9653. Grantsmanship. 3 Credit Hours.
This course exposes the Ph.D. level student to the mechanisms and methods of acquiring funding for Behavioral and Somatic Science Research. Students will learn Grantsmanship - the skills required to write a grant proposal. Learning experiences consist of literature review, writing key sections of a grant application, and if applicable, subject recruitment. Class time will be divided into lectures and discussion of assignments.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9654. Neuromotor Science: Laboratory Rotation and Seminar. 1 to 3 Credit Hour.
This course provides the student with an in-depth exposure to the laboratory methods and focus of a faculty member. Students will learn the conceptual basis for the research as well as technical skills such as instrumentation and data analyses pertinent to the areas of research that are core to the NMS program or in a cognate area of interest to the student. Two rotations (6 credit hours) are required for the Ph.D. degree students and a single rotation (3 credit hours) for the MS degree students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

NMS 9682. Neuromotor Science: Independent Study. 1 to 3 Credit Hour.
This course provides an opportunity for independent investigation and analysis of the intellectual, physical, social, psychological, and ethical bases of human movement. An independent study allows students to explore a well-defined area within Neuromotor Science and related fields in greater depth providing an opportunity for independent investigation and analyses of topics that enrich their academic and research training.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

NMS 9994. Doctoral Preliminary Exams. 1 Credit Hour.
This course supports preparation for taking the preliminary examinations in the Neuromotor Science program. To enroll, students must have completed all required coursework for the Ph.D. and obtain the approval of the Ph.D. Program Director. Students must be enrolled to take the required preliminary examinations.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

NMS 9998. Dissertation Proposal. 1 to 2 Credit Hour.
This course supports preparation of the dissertation proposal. The course is required for students who have passed the preliminary examinations for their programs and who have not yet defended the dissertation proposal.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of P in NMS 9994.

NMS 9999. Dissertation Research. 1 to 3 Credit Hour.
This course is limited to Ph.D. candidates who have completed and defended a dissertation proposal that is filed with the Graduate School by the last day to add a course in the semester. Continuous registration in 9999 fall and spring is required until the dissertation is successfully defended.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Dissertation Writing Student.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of P in NMS 9994.