

# Movement Science Major

The Movement Science (MOVESCI) major strives to fully develop the intellectual abilities of each student during their learning experiences in the School of Kinesiology. The program emphasizes the study of human movement from biological and behavioral perspectives across the lifespan. The Movement Science Department achieves their mission by offering a diversified program that includes introductory and advanced course work, research, and laboratory experiences. Success is evaluated by the academic and professional placement of graduates.

## Overview

The Movement Science major comprises coursework that emphasizes the causes and consequences of human movement from biomechanical, motor control, and development and physiological perspectives. The requirements include courses both in and outside of Kinesiology.

The Movement Science curriculum emphasizes competencies in four areas:

1. Three areas of Movement Science: Biomechanics, Motor Control, and Exercise Physiology
2. Research
3. Scientific communication, including written and graphic skills
4. Computer literacy

Students will gain these competencies by mastering concepts in courses, by exposure to research in laboratory sections of courses, and in independent study and research courses.

# Content Emphases of Major Areas in Movement Science

## 1. Biomechanics

- Describe movement from kinematics and kinetics perspectives.
- Apply biomechanical concepts and principles to analysis of motor skills among diverse and special populations.
- Understand underlying physical mechanisms involved in the control and coordination of movements.
- Understand basic mechanical properties of muscle, tendon, ligament and bone.
- Relate the mechanical loads placed on the human body to the mechanical properties of tissues.
- Identify basic biomechanical mechanisms used by humans to reduce metabolic cost and fatigue during movement.

## 2. Exercise Physiology

- Focus on metabolic, hormonal, cardiovascular responses to acute and chronic activity
- Understand regulation of different biological functions including cardiovascular, renal, pulmonary, musculoskeletal and endocrine systems during rest and movement.
- Understand mechanisms causing biological adaptations to chronic exercise at the molecular, cellular, systemic and whole-body level.
- Understand relationships between physical activity, energy, nutrition, chronic disease and health.
- Understand cardiorespiratory, nutritional, bioenergetic, metabolic, and endocrine basis of human performance.
- Understand and appreciate racial, ethnic, age-associated, and gender differences in exercise performance and in biological adaptations to movement.
- Assess flexibility, strength, and endurance factors that influence movement and physical performance.

## 3. Motor Control and Development

- Describe movement from a kinematic and associated muscle activation pattern perspective.
- Apply motor development and motor control concepts and principles to analysis of motor skills among diverse and special populations.
- Identify and differentiate among the diverse theories of motor skill acquisition.
- Identify factors affecting motor behavior, including physical growth, physical activity, physiological, perceptual and cognitive changes and sociocultural practices.
  - Understand the interaction between motor behavior and physical activity throughout the lifespan
- Understand the interaction between perception and action throughout the lifespan.
- Understand basic principles underlying neural and neuromuscular communication.
- Understand the relationship between central nervous system structure and function as it applies to human motor control in the context of health and disease.
- Understand the normal course of physical growth and maturation throughout the lifespan.

# Requirements

The Movement Science curriculum requires courses in of the following five categories:

## Required Non-Kinesiology Prerequisite Courses (38 credits)

**BIOLOGY 171** – Introductory Biology: Ecology and Evolution (4 cr.). External Transfer Students can also fulfill the introductory biology lecture sequence with successful completion of Biology 191 and Biology 192.

**BIOLOGY 172** – Introductory Biology: Cellular, Molecular, and Developmental. *Advisory Prerequisite: Prior or concurrent enrollment in Chem 130. (4 cr.)* or **BIOLOGY 174** – Introduction to Cell and Molecular Biology. *Biology 174 is equivalent to Biology 172, but Biology 174 involves a different learning format (reading prior to class, minimal lectures, group work and problem solving). Students should elect either Biology 172 or Biology 174 NOT both. Advisory Prerequisite: Prior or concurrent enrollment in Chem 130. (4 cr.)*. External Transfer Students can also fulfill the introductory biology lecture sequence with successful completion of Biology 191 and Biology 192.

**BIOLOGY 173** – Introductory Biology Laboratory. *Enforced Prerequisite: Biology 163 or 171 or 172 or 174 or 195. Advisory Prerequisite: Students should have completed one of the introductory lecture courses (either Biology 171 or (172 or 174)) and be concurrently enrolled in the other course. AP Credit (BIOLOGY 195) will not fulfill this lab requirement. (2 cr.)*

**CHEM 130** – General Chemistry: Macroscopic Investigations and Reaction Principles. *For students who do not take CHEM 130, successful completion of CHEM 210 will fulfill this requirement. (3 cr.)*

**FYWR or ENGLISH 125** – Writing and Academic Inquiry (4 cr.)

**MATH 115** – Calculus I (4 cr.) *AP credit for MATH 120 or MATH 120/121 will fulfill this requirement.*

**ANATOMY 403** – Human Anatomy: Structure and Function (5 cr.)

**PHYSICS 125** – Transfer credit for algebra-based Physics I (mechanical)

or **PHYSICS 140** – General Physics I (4 cr.) (C- or better)

or **PHYSICS 150** – Physics for the Life Sciences I (4 cr.) (C- or better)

**PHYSIOL 201** - Introduction to Human Physiology. *Prior completion of Biology 172 or Biology 174 strongly recommended. (4 cr.)*

**PSYCH 111** - Introduction to Psychology (4 cr.) or **PSYCH 112** – Introduction to Psychology as a Natural Science. (4 cr.) *Students should elect either PSYCH 111 or PSYCH 112, NOT both.*

## **Required Core Kinesiology Prerequisite Courses (6 credit hours)**

**MOVESCI 110** – Biological and Behavioral Bases of Human Movement (3 cr.)

**MOVESCI 219** – Scientific Writing (3 cr.)

## **University Distribution Courses (36 credit hours)**

Students must complete the Distribution Requirement of a minimum of 12 credits in Humanities, 12 credits in Natural Science, and 12 credits in Social Science.

To see which required courses count toward distribution, students should refer to the **MOVESCI Record Sheet**, found on the **Forms and Bulletins** page of the Kinesiology website (<https://www.kines.umich.edu/student-services/forms-bulletins>). For general distribution information, go to the Appendix.

## **Core Movement Science Courses (19 credit hours)**

**MOVESCI 230** – Human Musculoskeletal Anatomy. *Must be concurrently enrolled in MOVESCI 231.* (3 cr.)

**MOVESCI 231** – Human Musculoskeletal Anatomy Lab. *Must be concurrently enrolled in MOVESCI 230.* (1cr.)

**MOVESCI 250** – Statistics and Research Methods in Movement Science (3 cr.)

**MOVESCI 320** – Motor Control. *Prerequisites: MOVESCI 110, MOVESCI 219, ANATOMY 403 or MOVESCI 230 or AT/PHYSED 310 or AT/AES 220, MOVESCI 250, PHYSIOL 201 or MOVESCI 361.* (4 cr.)\*

**MOVESCI 330** – Biomechanics of Human Movement. *Prerequisites: MOVESCI 110, MOVESCI 219, MATH 115, ANATOMY 403 or MOVESCI 230, or AT/PHYSED 310 or AT/AES 220, and PHYSICS 125 transfer credit or a C- minimum grade in PHYSICS 135, 139, 140 or 150.* (4 cr.)\*

**MOVESCI 340** – Exercise Physiology. *Prerequisites: MOVESCI 110, MOVESCI 219, ANATOMY 403 or MOVESCI 230 or AT/PHYSED 310 or AT/AES 220, MOVESCI 250, PHYSIOL 201; CHEM 130 recommended.* (4 cr.)[2] [3] \*

**\*All Movement Science Core classes (320, 330 and 340) must be taken at the University of Michigan.**

## Upper-Level Elective Courses

Students must complete a minimum of nine credit hours of upper-division elective courses including at least six lecture-based courses.

### Movement Science Lecture-Based Upper Level Courses

A minimum of nine credit hours of upper-division Movement Science lecture-based courses from the following choices:

- **MOVESCI 413** – Special Topics in Movement Science. Used for new experimental courses in Movement Science.
- **MOVESCI 421** – Disorders of Voluntary Movement. *Prerequisites: MOVESCI 320.* (3 cr.)
- **MOVESCI 422** – Motor Learning. *Prerequisites: MOVESCI 320.* (3 cr.)
- **MOVESCI 423** – Sensory-motor Development. *Prerequisites: MOVESCI 320.* (3 cr.)
- **MOVESCI 424** – Aging and Motor Performance. *Prerequisites: MOVESCI 320.* (3 cr.)
- **AES/MOVESCI 425** – Disability and Movement (3 - 4 cr.)
- **MOVESCI 426** – Cognitive Neuroscience of Action. *Prerequisites: MOVESCI 320.* (3 cr.)
- **MOVESCI 427** – Mind and Brain of Expertise. *Prerequisites: MOVESCI 320.* (3 cr.)
- **MOVESCI 428** – Applied Motor Development in Children. *Prerequisites: Criminal background check and TB test must be completed/passed prior to visiting the site.* (2 cr.)+
- **MOVESCI 431**– Clinical Gait Analysis. *Prerequisites: MOVESCI 330.* (3 cr.)
- **MOVESCI 434/KIN 434** – Scientific Inquiry Using Motion Capture. (3 cr.)
- **MOVESCI 435** – Biomechanics of Human Locomotion. *Prerequisites: MOVESCI 330.* (3 cr.)
- **MOVESCI 437** – Motion Capture and Animation for Biomechanics. *Prerequisites: MOVESCI 330.* (3 cr.)
- **MOVESCI 438** – Introduction to Musculoskeletal Imaging. *Enforced Prerequisites: MOVESCI 230 and MOVESCI 330.* (3 cr.)
- **MOVESCI 441** – Environmental Exercise Biology. *Prerequisites: MOVESCI 340.* (3 cr.)
- **MOVESCI 442** – Exercise Endocrinology. *Prerequisites: MOVESCI 340.* (3 cr.)
- **MOVESCI 443** – Exercise and Successful Aging. *Prerequisites: MOVESCI 340.* (3 cr.)
- **MOVESCI 444** – Exercise and Nutrition. *Prerequisites: MOVESCI 340.* (3 cr.)
- **MOVESCI 446** – The Role of Social Factors in Shaping Physical Activity Behavior. *Prerequisites: (MOVESCI 219 or SM 217) and (MOVESCI 340 or PHYSED/AES 242).* (3 cr.)

- **MOVESCI 448** – Cardiovascular Exercise Physiology. *Prerequisites:* MOVESCI 250 and MOVESCI 340 (C+ grade min). (3 cr.)
- **MOVESCI 450** – Seminar in Adapted Physical Activity. (3 cr.)
- **MOVESCI 451** – Physical Activity Across the Lifespan. *Prerequisites:* MOVESCI 340 or AES 242 and MOVESCI 219 or SM 217. (3 cr.)
- **MOVESCI 452** – Scientific Inquiry Using Wearable Technology. *Prerequisites:* MOVESCI 340 (C grade min). (3 cr.)
- **MOVESCI 453** – Sport Concussion. *Prerequisites:* MOVESCI 330. (2 cr.)
- **MOVESCI 465** – Neuroanesthesia and Advanced Topics in IONM. *Prerequisites:* MOVESCI 320 and 464. (3 cr.)
- **MOVESCI 471** – Physical Activity Epidemiology. *Prerequisites:* MOVESCI 340. (3 cr.)
- **MOVESCI 474** – Worksite Wellness. *Prerequisites:* MOVESCI 340. (3 cr.)
- **MOVESCI 475/AT 420** – Pharmacology for the Allied Health Professions. *Prerequisites:* PHYSED/AT 310 or AT/AES 220 or PHYSIOL 201; CHEM 130. (2 cr.)

### Movement Science Experiential-Based Upper Level Courses

Students can elect to take up to three hours as experiential-based coursework. This option should be selected in consultation with an academic advisor and faculty member. Types of experiences are included below under the Independent Study Courses but must be 400 level to count as an MVS Upper-Level Elective.

### Movement Science Independent Study Courses

These courses are completely optional. However, three credit hours earned from independent study, internships, readings, or research in Movement Science can be substituted for one of the required lecture-based courses, listed above. A maximum of 20 credit hours can be selected from the following courses:

- **MOVESCI 380** – Problems in Movement Science (1-3 cr.)
- **MOVESCI 381** – Community Service Learning (1-3 cr.)
- **MOVESCI 382** – Honors Reading (1-3 cr.)
- **MOVESCI 384** – Honors Research (1-3 cr.)
- **MOVESCI 390** – Field Experience in Movement Science (1-8 cr.)
- **MOVESCI 402** – Teaching Experience in Movement Science (1-3 cr.)
- **MOVESCI 403** – Internship (.5-4 cr.) (Credit based on hours - 50 hrs equals one credit hour)
- **MOVESCI 425** – Laboratory Rotation in Disability and Movement (1 cr.)
- **MOVESCI 429** – Laboratory Rotation in Motor Control and Development (1-3 cr.)
- **MOVESCI 439** – Laboratory Rotation in Biomechanics (1-3 cr.)
- **MOVESCI 449** – Laboratory Rotation in Exercise Physiology (1-3 cr.)

- **MOVESCI 464** – Clinical Rotation in IONM 1. *Prerequisites: MOVESCI 363 (B-grade min)* (3 cr.)
- **MOVESCI 466** – Clinical Rotation in IONM II. *Prerequisite: MOVESCI 464 (S grade required)* (3 cr.)
- **MOVESCI 467** – Clinical Rotation in IONM III. *Enforced Prerequisites: MOVESCI 465 and 466 (S grade required)* (3 cr.)
- **MOVESCI 488** – Independent Study (1-3 cr.)
- **MOVESCI 489** – Senior Thesis (2-5 cr.)
- **MOVESCI 490** – Senior Honors Thesis A (1-5 cr.)
- **MOVESCI 491** – Senior Honors Thesis B (1-3 cr.)

### Cognate Elective Courses

A minimum of eleven credit hours of cognate elective courses, outside of Movement Science, are required. At least six of these eleven credit hours must be taken outside of the School of Kinesiology. The Movement Science department maintains a list of currently approved **MOVESCI Cognate Elective Courses**, which can be found on the **Forms and Bulletins** page of the Kinesiology website (<https://www.kines.umich.edu/student-services/forms-bulletins>). If a course does not appear on the list, students need to get approval by completing a **Petition Form** (available online on the **Forms and Bulletins** page of the Kinesiology website under the Undergraduate tab at <https://www.kines.umich.edu/student-services/forms-bulletins>, or in the Kinesiology Office of Undergraduate Student Affairs). Students are encouraged to choose cognate courses that may fulfill graduate or professional school requirements.

*PLEASE NOTE: This list is subject to change. Refer to the Kinesiology web site for the most up-to-date **MOVESCI Cognate Elective Courses** at <https://www.kines.umich.edu/student-services/forms-bulletins>.*

## Study Abroad

Credit from Kinesiology-sponsored and non-Kinesiology-sponsored study abroad programs can be used as general credit toward graduation and to fulfill Distribution requirements. With prior approval by the Movement Science Faculty Committee through the Study Abroad Course Approval Form, students can use study abroad credit to fulfill certain Movement Science requirements, including prerequisites, core courses, cognates, independent study, and lecture-based courses. See general policies and procedures for study abroad below.

# IntraOperative Neuromonitoring (IONM)

IntraOperative NeuroMonitoring (IONM) is a growing field that involves the monitoring and mapping of the central and peripheral nervous systems of patients undergoing surgical procedures such as orthopedic spinal correction (scoliosis treatment), cranial neurosurgery, and interventional radiologic procedures. IONM helps improve patient outcome by carefully assessing the functional status of nervous tissue, including spinal column tracts, eloquent brain regions, and peripheral nerves. This neurophysiologic information helps the surgeon perform a safer and sometimes more thorough procedure.

The School of Kinesiology's IONM program is seated within the Movement Science curriculum. The program consists of three lecture-based courses, a lab-based course and three clinical rotations. This curriculum prepares the student through class-work and hands-on experience for the Certification in Neurophysiologic Intraoperative Monitoring (CNIM) Exam.

## Policies

1. Students will need to enroll in Introduction to Surgical Neuromonitoring (**MOVESCI 361**) and complete an application process for acceptance to the IONM program. The application process is as follows:
  - Minimum 3.0 cumulative GPA
  - Current or prior enrolment/completion of MOVESCI 361 with a minimum passing grade of a B- (2.7)
  - Submission of two (2) letters of recommendation
  - Interview process with program director, clinical placement coordinator, and clinical site preceptors
  - Final acceptance decisions are made and notification letters are sent out by mid-May.
2. Students not enrolled in the School of Kinesiology may elect to take MOVESCI 361 and concurrently apply for acceptance into the IONM Program and also for transfer to the School of Kinesiology. Acceptance into the School of Kinesiology DOES NOT guarantee acceptance into the IONM Program.
3. All IONM courses must be taken in sequential order with the exception of **MOVESCI 465** and **466**, which are taken concurrently.
4. The following IONM courses can fulfill upper-division Movement Science elective requirements:

**MOVESCI 464** – Clinical Rotation in IONM I can fulfill three non-lecture-based (independent study) elective credits

**MOVESCI 465** – Neuroanesthesia and Advanced Topics in IONM can fulfill three lecture-based elective credits

Beyond **MOVESCI 464** and **465**, IONM students will still need to minimally complete an additional lecture-based MOVESCI course to complete the nine credits of upper-division MOVESCI credits (an additional non-lecture based/independent MOVESCI course will not meet this minimum requirement).



5. **MOVESCI 464** is mandatory and can only be elected in the Spring/Summer term and must be taken between students' first and second years in the IONM program. Students are encouraged to investigate housing options and financial aid considerations as early as possible.
6. The IONM subplan will be added to the student's transcript once the student completes **MOVESCI 361, MOVESCI 362, MOVESCI 363, MOVESCI 464, MOVESCI 645, MOVESCI 466, and MOVESCI 467.**
7. Upon acceptance to the IONM Program, students will be required to complete and submit documentation of adequate immunization records as well as other documents required for performance of clinical rotations and continuation in the program. These requirements can be accessed in the IONM Program Handbook on the Kinesiology - IONM website.
8. Students accepted into the IONM Program will be required to complete a criminal background check and drug screen.
9. All students in the IONM Program agree to abide with the IONM Program Handbook and Professional Conduct Policy.

## IONM Course Requirements

- **MOVESCI 361** – Introduction to Surgical Neuromonitoring. *Advisory Prerequisite: Physics 125 (transfer credit) or 140 or 150, C- or better.* (3 cr.)
- **MOVESCI 362** – Surgical Neuromonitoring Lab - *Enforced Prerequisite: Physics 126 (transfer credit) or 240 or 250, C- or better.* (3 cr.)
- **MOVESCI 363** – Intraoperative Neurophysiological Monitoring. *Prerequisite: MOVESCI 361 and MOVESCI 362 (B- grade min)* (4 cr.)
- **MOVESCI 464** – Clinical Rotation in IONM I. *Enforced Prerequisite: MOVESCI 363 (B- grade min), MOVESCI 320 (C- grade min)* (3 cr.)
- **MOVESCI 465** – Neuroanesthesia and Advanced Topics in IONM. *Prerequisite: 464 (C- grade min)* (3 cr.)
- **MOVESCI 466** – Clinical Rotation in IONM II. *Enforced Prerequisite: MOVESCI 464 (C- grade min)* (3 cr.)
- **MOVESCI 467** – Clinical Rotation in IONM III. *Enforced Prerequisites: MOVESCI 465 (C- grade min) and 466 (C- grade min)* (3 cr.)

For more information, please visit the **IONM page** on Kinesiology website (<https://www.kines.umich.edu/ionm>).

## The Movement Science Honors Program

The Movement Science honors program in Kinesiology offers qualified students advanced coursework and independent research opportunities in exercise physiology, biomechanics, and motor control and development. Students with strong intellectual interests and the commitment to pursue those interests in a rigorous and challenging environment are eligible for the Movement Science honors program.

Honors students are expected to pursue a rigorous and diversified course of study. Students must complete the regular Movement Science curriculum as well as advanced coursework, independent study, and a thesis during the senior year. Students must maintain a 3.5 GPA throughout the program. Each April, a subcommittee of the Movement Science faculty will review each student's academic record and recommend continuation or termination.

### Admission to the Movement Science Honors Program

The School of Kinesiology is committed to achieving an Honors student body characterized by ethnic and racial diversity as well as gender balance.

Following review of applications for admission to the School of Kinesiology, qualified students will be invited to enter the Honors Program. These invitations are based on evidence of exceptional scholarly ability and motivation. Admission decisions will be based on the following:

1. High school GPA (suitably adjusted for the difficulty of work elected - typically above 3.8)
2. Class standing
3. National test scores (SAT of 1200 or above, ACT composite of 32)
4. Professor recommendations
  - a. Academic Statement of Purpose Regarding your Intent in Pursuing the Honors Program

Second-year Movement Science students may apply to begin the Honors Program as juniors. Only those students with distinguished academic performance (cumulative GPA of 3.5 in a minimum of 50 credit hours, including completion of MOVESCI 250 or equivalent, MVS 219, and all core pre-requisite courses both inside and outside Kinesiology) will be considered for admission.

### Movement Science Honors Requirements

The Honors program requires students to take the Honors sections of some Movement Science core courses, and to complete independent research experiences, culminating in a Senior Honors Thesis. Each requirement is described below.

**Honors Sections.** Students complete the honors sections of MOVESCI 320, 330, and 340 by the end of junior year. To receive honors credit, students will complete a special project

connected to the course as well as the regular course requirements. In consultation with the faculty instructor, such special projects may, for example, take the form of a literature review or class presentation. Honors students in the same class may work together on a project approved by the faculty instructor. Honors students will fill out a contract with the faculty instructor precisely stating the scope of the honors work. In situations where a student elects to take a core course in his/her second year and has not yet been accepted into the Honors Program, the student must make arrangements with the appropriate faculty member to complete the honors requirement of the core course.

**Honors Independent Study and Honors Research Proposal.** Students must complete a minimum of six credits of independent study with a research focus by the end of the junior year. Up to three independent credits obtained prior to a student's junior year can be counted. Honors independent research study experiences typically involve supervised and directed participation in the laboratory of a Movement Science faculty member. In many cases, these independent research study experiences assist the student in identifying a research mentor and help lay the groundwork for the senior honors thesis. Honors students will fill out an independent study contract form found at <https://www.kines.umich.edu/student-services/forms-bulletins#undergraduate-general> with a faculty member stating the nature of the research experience.

A thesis proposal must be submitted to the sponsoring faculty member by the end of winter semester of student's junior year. The proposal should include a rationale for the project, the specific questions to be answered or hypotheses to be tested, the methods to be used, the potential results of the student's proposed research, and a bibliography. The proposal must include the signature of the faculty mentor indicating support of the proposal. It is highly recommended that students arrange to start doing honors thesis research during the spring and/or summer semesters between their junior and senior years. Typically, financial support will be sought from the faculty mentor. In some instances, some financial support may be available from other sources.

**Senior Honors Thesis - MOVESCI 490-491 (5 credits).** The honors thesis is due three weeks before the end of the winter semester. In March of each academic year, students will make oral presentations of their thesis work in a Division-wide forum, to be arranged with their thesis advisors. While there is no set length requirement, the honors thesis is expected to reflect a rigorous and in-depth analysis of a specific problem in movement science requiring a sustained period of investigation but appropriate for study at the honors undergraduate level. The goal of the honors thesis is to generate new and relevant information that may lead to an abstract submission to a national conference, form the basis for a peer-reviewed manuscript, or provide pilot work for graduate studies. The 5 credits will be distributed over two semesters in consultation with your faculty mentor.

For more information, please contact Dr. Susan Brown ([shcb@umich.edu](mailto:shcb@umich.edu)), or complete the **MOVESCI Honors Program Application**, found on the **Forms and Bulletins** page of the Kinesiology website, <https://www.kines.umich.edu/academics/movement-science/undergraduate/honors-program>.

## Interprofessional Education

The School of Kinesiology is one of nine health science schools participating in Interprofessional Education.

“Interprofessional education occurs when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes. Once students understand how to work interprofessionally, they are ready to enter the workplace as a member of the collaborative practice team. This is a key step in moving health systems from fragmentation to a position of strength.” (Source: World Health Organization (WHO). (2010). *Framework for action on interprofessional education & collaborative practice*. Geneva: World Health Organization. Accessed from <https://interprofessional.umich.edu/about/what-is-ipe/>)

Students have many opportunities through IPE to learn from, with and about other health professions. For more information, please visit: <https://interprofessional.umich.edu/> and make an appointment with your academic advisor for more information.

## Movement Science Minor for Dance Majors

Kinesiology offers a minor in Movement Science to Dance majors in the School of Music. The Movement Science minor is a course of study focused on the fundamental aspects of human performance. Upon completion of the minor, students will have a broad understanding of the biological and behavioral aspects of human movement. Other majors interested in completing the Movement Science minor should communicate with the Movement Science Department Chair to express their educational goals and gain approval.

A minor in Movement Science requires completion of two core courses, a musculoskeletal anatomy lab, and nine elective credits. All credits are taken in-residence. Students who declare and complete an approved academic minor will receive a notation on their student transcript, but not on their diploma.

### Policies

1. Each student who wishes to complete an approved academic minor must develop an approved plan for the academic minor in consultation with a Movement Science faculty member or academic advisor.
2. After developing a plan for the academic minor, the student works with the Kinesiology Office of Undergraduate Student Affairs to have the academic minor entered on the student's record.
3. An individually designed academic minor is not allowed.
4. Courses in the academic minor must be elected for a grade.

5. Students may not use more than one course to meet the requirements of both a major plan and an academic minor.
6. Courses elected to meet the requirements of an academic minor may be part of the student's area distribution plan.
7. A student must earn an overall GPA of at least 2.0 in the academic minor.
8. No course may be used to satisfy the requirements of more than one academic minor.

## Minor Requirements

1. Required Courses. The following courses are required:
  - **MOVESCI 110** – Biological and Behavioral Bases of Human Movement (3 cr.)
  - **AES 220** – Applied Human Physiology (4 cr.)
  - **MOVESCI 231 or AES 221** – a Musculoskeletal Anatomy Lab or Physiology lab
  - **Elective courses**. A minimum of 9 credit hours are required. At least two of the courses must be Movement Science courses. Any Movement Science course at the 300 or 400 level can be elected except independent study courses. Courses from the following list can also be elected:
    - **MOVESCI 230**– Human Musculoskeletal Anatomy (3 cr.)
    - **MOVESCI/AES 240**– Introduction to Fitness and Health (3 cr.)
    - **MOVESCI/AES 241**– Exercise, Nutrition and Weight Control (3 cr.)
    - **AT 326/PHYSED 326/AT 525**– Fundamentals of Strength and Conditioning.  
*Advisory Prerequisite: Anatomy and Physiology course (3 cr.)*
    - **AES 332** – Principles of Motor Behavior. *Prerequisite: AT/PHYSED 310 or AT/AES 220 (3 cr.)*

## Criteria For Cross Campus Transfer Admission for the Movement Science Major

The School of Kinesiology accepts applications for Fall and Winter terms only. Students can apply for their sophomore year or junior year only. Admission is selective and pending space available. Please note that transferring into Kinesiology may require additional time to complete your degree. This depends on the progress you have made toward the MOVESCI degree and additional courses you elect to take outside of the MOVESCI curriculum.

Deadlines: October 1 for Winter Semester

February 1 for Fall Semester

## Sophomore Level Admission Requirements

Natural science and quantitative reasoning courses beyond this list are also considered. If you are a pre-health student and fulfilling graduate school prerequisites in those categories, you will still be competitive.

***Cumulative GPA of 3.0 and recommended completion of FOUR of the following prerequisite courses:***

- BIOLOGY 171\*: Intro Biology: Ecology and Evolution
- BIOLOGY 172\*: Intro Biology: Molecular, Cellular, and Developmental
- BIOLOGY 173\*: Intro Biology Laboratory
- CHEM 130\*: General Chemistry or higher level Chemistry
- MATH 115\*: Calculus I or higher
- MOVESCI 110: Biological and Behavioral Bases of Human Movement
- PHYSICS 135(150)\*: Physics for the Life Sciences I or PHYSICS 140: General Physics I
- STATS 250: Intro to Statistics and Data Analysis. ***STATS 250 will fulfill the MOVESCI 250 requirement if it is taken prior to admission. After admission, students need to take MOVESCI 250.***

## Junior Level Admission Requirements

Natural science and quantitative reasoning courses beyond this list are also considered. If you are a pre-health student and fulfilling graduate school prerequisites in those categories, you will still be competitive.

• ***Cumulative GPA of 3.0 and recommended completion of ALL of the following prerequisite courses:***

- MATH 115\*: Calculus I or higher
- MOVESCI 110: Biological and Behavioral Bases of Human Movement
- MOVESCI 230, 231: Human Musculoskeletal Anatomy or ANAT 403: Human Anatomy
- PHYSICS 135(150)\*: Physics for the Life Sciences I or PHYSICS 140: General Physics I
- PHYSIOL 201: Human Physiology
- STATS 250: Intro to Statistics and Data Analysis. ***STATS 250 will fulfill the MOVESCI 250 requirement if it is taken prior to admission. After admission, students need to take MOVESCI 250.***
- **AND**
- ***Completion of TWO of the following pre-requisite courses:***
- BIOLOGY 171\*: Intro Biology: Ecology and Evolution
- BIOLOGY 172\*: Intro Biology: Molecular, Cellular, and Developmental
- BIOLOGY 173\*: Intro Biology Laboratory
- CHEM 130\*: General Chemistry or higher level Chemistry

*\*or equivalent Advanced Placement (AP) credit*