Exercise Science – M.S. Degree
School of Health & Human Performance
Northern Michigan University
The graduate program in Exercise Science is a two-year program of study for students with undergraduate backgrounds in athletic training, biological sciences, dietetics, health, nursing, physical education, physiology, and physical therapy. The primary objective of the program is to provide students with a working knowledge of the physiological and biomechanical aspects of human movement and exertion. A core of 17 required credits provides a strong foundation in the science of exercise. Students also complete a minimum of 15 elective credits that provide specialized study in a variety of applied areas.

NMU Exercise Science graduates have secured careers in corporate/adult fitness, cardiac rehabilitation, clinical graded exercise testing services, clinical exercise physiology, collegiate strength and conditioning coaching, specific sport coaching, physiology equipment sales, and personal training. Graduates have also pursued studies at the doctoral level in exercise physiology, biomechanics, physical therapy and medicine.

Admission Requirements

Students are admitted to the program for Fall Semester entry each year. To qualify for Regular admission applicants must have a minimum overall undergraduate grade point average of 3.0 and a grade point average of 3.0 or higher in a relevant major or 9 semester hours of relevant course work (human anatomy and physiology, exercise physiology, kinesiology/biomechanics, physics or nutrition). Applicants who do not meet the standards for regular admission but have a minimum grade point average of 2.50, may be admitted on a Conditional basis. Such applicants must also have completed the relevant course work listed above with a 3.0 grade point average in these courses. All applicants with less than a 2.75 are strongly encouraged to submit letters of recommendation from professionals familiar with their capability for advanced study in exercise science.

Application:  http://webb.nmu.edu/Colleges/GraduateStudies/ then click the Admission tab.

Graduate Assistantships

The Exercise Science program normally supports several graduate assistant positions. Graduate assistants are assigned responsibilities that may include teaching laboratory sections for exercise physiology or anatomical/mechanical kinesiology, teaching in the health promotion activities program, or working with the University adult fitness program (GETFIT). Graduate assistants are typically assigned a semester workload equivalent to 16-20 hours per week and receive a stipend plus tuition waiver for 16 credits per year. Applicants interested in being considered for a graduate assistant award must meet the standards listed under admission requirements for Regular admission. In addition, graduate assistant applicants must submit three letters of recommendation, provide a one-page personal statement, and provide an assessment of their ability to teach health promotion and physical activities, exercise science laboratory sections, and perform in an exercise leadership role and/or research assistant role.

An application form for the Graduate Assistantship award may be found under the link for Faculty and Students on the Graduate Studies web page: http://webb.nmu.edu/Colleges/GraduateStudies/.
Graduate Assistant applicants in Exercise Science must also complete a Teaching Checklist (available as a PDF download from the Exercise Science web page). All Exercise Science GA application materials should be submitted by February 15th for the subsequent Fall Semester.

International Students

Additional information for international students is available from the International Affairs Office. Go to: http://www.nmu.edu/international_affairs/. International students must apply for admission one year prior to their expected start date to ensure sufficient time for application processing. A TOEFL score of 173 computer-based, iBT 60 or higher, or 500 paper-based is required for consideration.

Academic Advisors

Randall (Randy) L. Jensen, Ph.D. FACSM FISBS CSCS - program coordinator
Research interests: biomechanics, cycling, aquatics, aspects of muscular strength and power.
rajensen@nmu.edu - 906/227-1184

Phillip (Phil) B. Watts, Ph.D. FACSM
Research interests: physiology, exercise metabolism, rock climbing performance, cross-country ski racing.
pwatts@nmu.edu - 906/227-1143

Scott N. Drum, Ph.D. FACSM CSCS
Research interests: physiology, ultra endurance, trail running, hypoxic/altitude training, exercise gadgets/fads, clinical exercise physiology (i.e. cancer and exercise training)
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Additional information


Information about the campus is available via links from: www.nmu.edu/about/.

Information about the local area and region may be found at: http://marquettecountry.org/.

Address postal inquiries to:

Exercise Science
School of Health & Human Performance
Northern Michigan University
1401 Presque Isle Avenue
Marquette, MI 49855 USA
Requirements

Six specific courses (17 credits) are required and combined with a minimum of 15 elective credits for the degree. Students must also complete a formal Research Thesis (4 credits; Thesis Option) or submit two formal written File Papers (Non-Thesis Option). Thesis credits will count as part of the 15 elective credits for the degree.

Required Courses:

ES 500 - Introduction to research (2 credits)
ES 511 - Statistics and measurements (3)
ES 521 - Advanced exercise physiology (3)
ES 540 - Advanced mechanical kinesiology (3)
ES 531 - Advanced seminar in exercise science (3)
HN 516 – Sport nutrition (3)

Elective Course Selections:

A minimum of 15 elective credits are required for the degree. These credits may be taken in a variety of areas.

ES 501 Readings in exercise science (1)
ES 571 Laboratory procedures (various topics) (1)
ES 572 Internship in adult fitness/cardiac rehab. (1-2)
ES 595 Special topics in exercise science (var.)
ES 597/598 Directed study (1-4)
ES 599 Thesis (1-4)
ES 421 Physiology of training for sport (3)
ES 422 Sport biomechanics (2)
ES 470 Psychology of athletic performance (2)
ES 476 Exercise and fitness for special populations (2)
ES 475 Theory of strength and conditioning (2)
HL 470 Electrocardiography (1)
HL 471 Exercise specialization (2)
HL 472 Health & exercise leadership skills (2)
HN 415 Obesity and weight management (4)
HN 452 Clinical nutrition (4)
BI 425 Endocrinology (3)
BI 510 Advanced human physiology (4)
BI 511 Advanced animal physiology (3)
CH 450 Intro. Biochemistry I (4)
CH 452 Biochemistry II (4)
CH 454 Biochemical techniques (4)

**Exercise Modes**

- Multiple exercise/fitness treadmills
- High-speed research treadmill
- Oversized treadmill (8'x10' – accommodates roller skiing and bicycling)
- Multiple mechanically braked Monark cycle ergometers and Schwinn Airdyne cycle ergometers
- Multiple Concept II rowing ergometers
- Lode Excaliber Sport cycle ergometer with Wingate anaerobic power testing and pedal force
- VASA Ergometer mounted for XC ski poling
- 10'x10' rock climbing wall with mounts for four 3-dimensional force platforms
- 4'x13' 45-degree overhanging rock climbing board
- 10'x15'x10' Hypoxic chamber simulating altitude to a maximum of ~5200m (17000ft)

**Strength and General Physiology**

- Biodex System 4 isokinetic dynamometer
- Biodex Balance System
- Multiple PCB force sensors; one in an apparatus for measuring finger curl force
- Four Biopac MP150 data acquisition systems for ECG, EMG, force data, skin temp
- BTS FreeEMG300 8 channel telemetry EMG system; includes interface for electrogoniometers and accelerometers. Can also be direct linked to Motion Analysis system and Biodex.

**Metabolism/Pulmonary**

- SensorMedics/CareFusion VMax29c bxb expired air & pulmonary analysis system
- CareFusion VMax Encore metabolic expired air & pulmonary analysis system
- CareFusion/Jaeger Oxycon Mobile portable expired air analysis system
- LactatePro whole blood lactate analysis

**Cardiovascular/Pulmonary**

- Marquette Electronics MAX-1 12-lead exercise ECG with integrated GE treadmill
- Polar heart rate monitors + computer interface
- Numerous setups for measuring blood pressure via auscultation
- Flow volume loop spirometry (all CareFusion analyzers)

**Biomechanics (In addition to the above)**

- Motion Analysis Corporation (MAC) 6 camera system (3 Raptor, 3 Hawk cameras) 3D retro reflective kinematic system with Cortex 2 software
- MaxTraq 2D video analysis system
- One high-speed Casio ExLIM-1 video camera (up to 600 Hz)
- Four AMTI 3-dimensional force platforms, 2 with underwater capability
- 1 Portable AMTI force platform
- Two dual plane Biometrics Electrogoniometers (work with Biopac and BTS)
- Two instrumented bicycle wheels for measuring power output and cadence
- Multiple electrogoniometers (BioPac)
- Electromyography (see BioPac and BTS above under Strength and General Physiology)