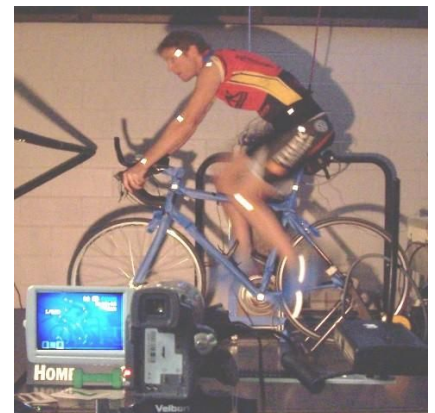
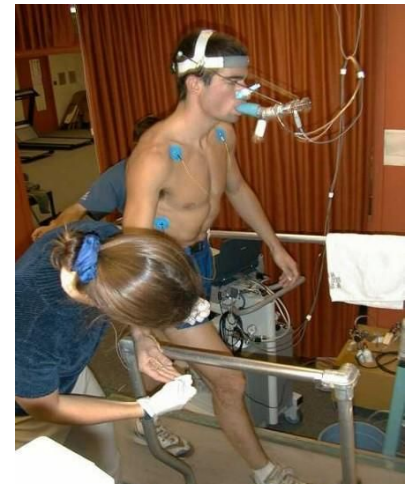


Exercise Science – M.S. Degree

School of Health & Human Performance Northern Michigan University



Exercise Science – M.S. Degree

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. The application deadline for each Fall entry is July 15th.

Application

<http://www.nmu.edu/graduatestudies/node/1> then click the Students followed by the Admission tabs.

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 kinesiology, teaching in the health promotion activities program, and/or working with the University adult fitness program (GETFIT). Graduate assistants are typically assigned a semester workload equivalent to 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 at:

<http://www.nmu.edu/graduatestudies/node/28>.

Graduate Assistant applicants in Exercise Science must also complete a Teaching Checklist (available as a PDF download at: <http://www.nmu.edu/hhp/ga-teaching-checklist>). 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/internationalprograms/> . 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, or an IELTS score of 6.5 for consideration."

Academic Advising

Sarah Breen, Ph.D. FISBS, CSCS – program director sabreen@nmu.edu

Additional information

WEB: <http://www.nmu.edu/hhp/> click on the link for Graduate Program – Exercise Science.

Information about the campus is available via links from: <https://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

Program 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	(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; others may be available.

AIS 535 Using Scholarly Library Resources	(2)
ES 501 Readings in exercise science	(1)
ES 571X Laboratory procedures (various topics)	(1 per topic)
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	(3)
ES 470 Psychology of athletic performance	(3)
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)
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)

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NMU Exercise Science Laboratory - Current Instrumentation – Jan 2019

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 wall 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
- Three Biopac MP150 data acquisition systems for ECG, EMG, force data, skin temp
- BTS FreeEMG300 8 channel wireless telemetry EMG system; includes interface for electrogoniometers and accelerometers. Can also be direct linked to Lode bicycle ergometer and Biodex.
- Noraxon 8 channel wireless telemetry EMG system; Can also be direct linked to Motion Analysis (MAC) 6 camera system and force platforms.

Metabolism/Pulmonary

- SensorMedics/CareFusion VMax29c bxb expired air & pulmonary analysis system
- CareFusion/Jaeger Oxycon Mobile portable expired air analysis system
- Parvo Medics 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) 10 camera system (3 Kestral, 4 Raptor-E, 3 raptor H cameras) 3D retro reflective kinematic system with Cortex 5 software
- MaxTraq 2D video analysis system
- Two high-speed Casio video cameras (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
- Three RehaWatch tri-axial accelerometers with data-logger
- Electromyography (see BioPac and BTS, and Noraxon above under Strength and General Physiology)
- Witty Wireless Training timing gate system
- Visual 3D software

NMU Exercise Science Graduate Faculty

Sarah Breen, PhD

sabreen@nmu.edu PEIF 214

Main discipline area: Sport & Exercise Biomechanics

Specific research interests: Anterior Cruciate Ligament Injury prevention, rehabilitation and long term consequences, Sport Injury, Running/Walking Gait, Balance & Coordination at Altitude, Dynamical Systems Theory, Elderly Function.

Will Direct 2 active Theses concurrently; no limitation on service as Reader.

Scott Drum, PhD

sdrum@nmu.edu PEIF 201F

Main discipline area: Exercise Physiology

Specific research interests: trail running and load (e.g., water bottle, pack, fuel belt, new technique?) carrying, the training/eating/racing habits of ultra-runners and successful collegiate running programs, exercise gadgets or fads, performance enhancing nutrition (e.g., studying the effects of “new” sport drinks on time trial performance in runners or cyclists), XC skiing, rock climbing/mountaineering, ice climbing and energy expenditure, hypoxia/altitude training, clinical exercise physiology (i.e., cancer and exercise training), obesity and hypoxia, and in general non- traditional sport studies (e.g., energy cost of paddle boarding, etc.).

Will Direct 2-3 active Theses concurrently; no limitation on service as Reader

Yuba Gautam, PhD

ygautam@nmu.edu PEIF 201G1

Main discipline area: Community Health Education

Specific research interests: emergency care and disease prevention, community health, health communication, sexuality education, cardiovascular disease prevention, international health issues, technology in health education, and health promotion of college students.

Randy Jensen, PhD

(currently on limited appointment)

rajensen@nmu.edu PEIF 221

Main discipline area: Biomechanics

Sub area: Statistics

Specific research interests: Strength conditioning, plyometrics, cycling, swimming, triathlon, kinematic (motion) analysis, kinetic (force) analysis, statistics

Will Direct 1 active Thesis; no limitation on service as Reader.

Lanae Joubert, PhD

ljoubert@nmu.edu PEIF 222

Main discipline area: Nutrition and Sport Science; Nutrition Education

Specific research interests: Sports nutrition, dietary supplements, metabolic aspects of exercise, energy expenditure, heart disease risk factors, education; most familiar with these sports/activities: swimming, rock climbing, mt. biking, yoga, hiking, triathlon.

Will Direct 1 active Thesis; no limitation on service as Reader.

Matt Kilgas, PhD

mkilgas@nmu.edu PEIF 229

Main discipline area: Exercise Physiology

Specific research interests: Exercise for special populations (orthopedic injury, cardiovascular/metabolic diseases, elderly, spinal cord injury, etc.), vascular physiology (blood flow control during exercise, vascular adaptations to exercise), novel exercise interventions (exercise with blood flow restriction, eccentric exercise training, hypoxia training, single-leg cycling, etc.), non-traditional exercise (rock climbing, mountain/snow biking, yoga, mindfulness, etc.)

Will direct 1 active thesis, no limitation on service as a reader.

Derek Marr, PhD

dmarr@nmu.edu PEIF 201G2

Main Discipline: Sport
Psychology

Sub Discipline: Elite, NCAA and Peak Performance

Specific Research Interests: Psychosocial Aspects of Peak Performance. Self-talk in Elite and NCAA populations. Self-efficacy and its effect on peak performance in culminating events (Championship Games, Olympic, National Championships, State Championships, Etc.). Endurance athletics, self-talk and its effect on pain tolerance / perception of pain.

Will direct 1 active thesis at a time with up to 3 as a reader.

Maggy Moore, PhD

mmoore@nmu.edu PEIF 201C

Main Discipline Area: Athletic Training

Sub Area: Epidemiology, Motor Development, Cognition

Specific research interests: primarily interested in migraine, youth concussion, balance, perceptions of risk or perceptions in AT. I also enjoy anything regarding eating disorders and clinical based research in exercise.

Will Direct up to 2-3 active concurrent Theses. No limitation on service as a Reader.

Julie Rochester, EdD

jrochest@nmu.edu PEIF 237

Main discipline area: Athletic Training

Specific research interests: Qualitative methods. Particular interest in job/career satisfaction, leadership styles, student perceptions & interactions, impact on learning.

Has served as Reader for Thesis work. No limitation on service as reader.

Elizabeth Wuorinen, PhD

ewuorine@nmu.edu PEIF 201A

Main discipline area: Exercise Physiology

Sub discipline: Immunology

Specific research interests: Hormonal regulation of food intake; exercise effects on the psychophysical aspects of hunger; exercise endocrinology; exercise immunology; exercise and nutritional effects on protein and antioxidant changes in plasma. Previously has been a head track & field and cross country coach.