

Exercise Physiology, M.S.

Degree Offered

- Master of Science in Exercise Physiology

Chair and Director of Undergraduate Education

Randall W. Bryner, EdD, Associate Professor, rbryner@hsc.wvu.edu
<http://medicine.wvu.edu/exercise-physiology/bachelor-of-science-bs/>

Director of MS Studies

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<http://medicine.wvu.edu/exercise-physiology/master-of-science-ms/>

Nature of the Program

The master's of science has three areas of emphasis: clinical, research, and tactical. Students will complete core coursework of 19 - 21 credit hours in addition to the hours required in their area of emphasis.

Clinical exercise physiology students engage in an intensive curriculum of 15 additional credits within the area of emphasis. Didactic coursework in biological and health sciences is balanced with the clinical experiences and techniques needed to take the Clinical Exercise Physiologist (CEP) exam as well as serve clinical populations. Students gain experience working with individuals in which exercise has been shown to be an effective treatment (e.g., cardiovascular, metabolic, and neuromuscular conditions). Students also assist clinical faculty in the WVU Human Performance Laboratory with functional assessment, risk factor modification, exercise prescription, and monitoring hemodynamic responses in populations with various medical conditions.

All students are required to complete clinical internships spread primarily between cardiac, pulmonary, metabolic, and musculoskeletal areas. These internships are performed in Phase I (inpatient), Phase II (outpatient), and Phase III (maintenance) cardiac rehabilitation programs, as well as observation opportunities within the WVU Heart and Vascular Institute and Bariatric Surgery. Students are also encouraged to become involved with any of the various clinically related research projects being performed within the Division of Exercise Physiology.

Research exercise physiology is a two-year program and is designed for students who wish to engage in an intensive research training experience, in preparation for further training in a PhD, MD, or similar postgraduate program. Students in the track select a research mentor and committee from faculty within the Division of Exercise Physiology (or an affiliated group) based on their research interests. The area of emphasis includes 14 additional credits beyond the core. The first year consists of didactic coursework, while learning the necessary research skills and tools to conduct research. In the second year, students can focus heavily on all aspects of research and the production and oral defense of a research thesis.

The faculty who will act as primary mentors in exercise physiology have research and/or clinical expertise in:

- Heart disease
- Motor unit recruitment in stroke and disability
- Biomechanical and motor control for gait in stroke or spinal cord injury
- Muscle injury and repair
- Cancer cachexia and muscle wasting diseases
- Aging and sarcopenia in skeletal muscle
- Cardiac and skeletal muscle growth and function
- Vascular dysfunction with the metabolic diseases
- Alzheimer's Disease and vascular contributions to cognitive impairment and dementia
- Stem cell biology and mechanical signal and tissue regeneration

Tactical performance physiology students will complete 13 additional credits within the area of emphasis. After program completion, graduates will be eligible to complete the highest nationally- and internationally-recognized certification exams within the field of tactical performance physiology: Tactical Strength and Conditioning-Facilitator (TSAC-F®), Certified Strength and Conditioning Coach (CSCS®), and Certified Performance and Sport Scientist (CPSS®), all offered by the National Strength and Conditioning Association (NSCA®).

This specialization will prepare students to address the overall health, fitness, and readiness of tactical personnel, integrating exercise physiology, sports nutrition, and human physiological responses to physical and psychological stress to increase readiness and resiliency among these populations.

ADMINISTRATION

CHAIR AND DIRECTOR, UNDERGRADUATE STUDIES

- Randall Bryner - EdD (West Virginia University)
Associate Professor

DIRECTOR, MASTERS OF SCIENCE GRADUATE PROGRAM

- Paul D. Chantler - PhD (Liverpool John Moores University)
Professor

DIRECTOR, PHD PROGRAM

- Paul D. Chantler - PhD (Liverpool John Moores University)
Professor

VICE DIRECTOR FOR GRADUATE STUDIES, DIVISION OF EXERCISE PHYSIOLOGY

- Dharendra Thapa - PhD (West Virginia University)
Assistant Professor

ASSISTANT CHAIR

- Miriam E. Leary - PhD (University of Texas at Austin)
Associate Professor

DIRECTOR OF GLOBAL EDUCATION AND SERVICE LEARNING

- Beth Nardella - PhD (West Virginia University)
Associate Professor

EXECUTIVE DIRECTOR OF CLINICAL PROGRAMS AND RESEARCH, HUMAN PERFORMANCE LABORATORY

- Paul D. Chantler - PhD (Liverpool John Moores University)
Professor

DIRECTOR, HUMAN PERFORMANCE LABORATORY

- Brett Rice - MS (West Virginia University)

PROGRAM COORDINATORS

- Jillian Descoteaux - PhD (Ohio University)
Dance Science, Assistant Professor
- Brian Leary - PhD (University of Texas at Austin)
Tactical Performance Physiology, Assistant Professor
- Lori Sherlock - EdD (West Virginia University)
Aquatic Therapy, Professor

CO-DIRECTORS, CLINICAL & TRANSLATIONAL SCIENCE PHD PROGRAM

- Paul D. Chantler - PhD (Liverpool John Moores University)
Professor
- I. Mark Olfert - PhD (Loma Linda University)
Professor

FACULTY

PROFESSORS

- Paul D. Chantler - PhD (Liverpool John Moores University)
Metabolic Syndrome, Vascular Biology, Effects of Aging and CV Diseases on Arterial and Venticular Structure and Function
- John M. Hollander - PhD (University of Wisconsin-Madison)
Diabetes, Mitochondria Dysfunction, Molecular Regulation of Heart Disease
- Jean L. McCrory - PhD (Penn State University)
Biomechanics, Gait, Foot injuries
- I. Mark Olfert - PhD (Loma Linda University)

Angiogenesis, Respiratory Physiology, Toxicology

- Ming Pei - PhD, MD (Beijing Medical University, Xuzhou Medical College)
Stem Cells, Cartilage Repair
- Lori Sherlock - EdD (West Virginia University)
Aquatic Therapy in Obesity

ASSOCIATE PROFESSORS

- Daniel E. Bonner - MS (West Virginia University)
Clinical Exercise Physiology
- Randall Bryner - EdD (West Virginia University)
Diabetes, Exercise, and Cancer
- David Donley - MS (West Virginia University)
Exercise and Metabolic Syndrome
- Beth Nardella - PhD (West Virginia University)
Global Education and Service Learning
- Emidio E. Pistilli - PhD (West Virginia University)
Muscular Dystrophy, Muscle Injury, Cytokines, Cancer Biology
- Miriam E. Leary - PhD (University of Texas at Austin)
Student Retention, Teaching and Learning, Community Engagement, Exercise Nutrition
- Emily Ryan - PhD (Kent State University)
Obesity Exercise
- Sergiy Yakovenko - PhD (University of Alberta)
Neuromuscular Integration of Movement

ASSISTANT PROFESSORS

- Jillian Descoteaux - PhD (Ohio University)
Dance Science
- Andrew Lane - PhD (University of Florida)
- Brian Leary - PhD (University of Texas at Austin)
- Dharendra Thapa - PhD (West Virginia University)
- James Thomas - MS (West Virginia University)
Exercise, Children, Strength Training

ASSOCIATE PROFESSORS EMERITI

- Diana Gilleland - MS (West Virginia University)
- Guyton Hornsby - PhD (West Virginia University)

Degree Requirements

Code	Title	Hours
A minimum GPA of 3.0 is required in all courses		
A grade of B- or higher must be earned in all required courses		
EXPH 567	Exercise Physiology 2	4
EXPH 672	Professional Field Placement	8
or EXPH 697	Research	
PSIO Elective (500- to 700-level; consult with advisor)		4-5
Electives *		3-4
Select one of the following:		
Clinical Exercise Physiology		
PCOL 549	Pharmacology Fundamentals for Future Healthcare Professionals	
Research Exercise Physiology		
Consult with research mentor on an individual basis.		
Tactical Performance Physiology		
EXPH 610	Environmental Exercise Physiology	
or EXPH 667	Advanced Exercise Nutrition	
Required Area of Emphasis **		13-15

Clinical Exercise Physiology (15 Hours)

Research Exercise Physiology (14 Hours)

Tactical Performance Physiology (13 Hours)

Number of credits will vary based on selected area of emphasis.

Total Hours

32-34

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Select one elective based on area of emphasis in consultation with advisor.

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As part of the total hours required for graduation, all students must complete one of the master's-level areas of emphasis in exercise physiology.

Areas of Emphasis

- Clinical Exercise Physiology (p. 4)
- Research Exercise Physiology (p. 4)
- Tactical Performance Physiology (p. 4)

Clinical Exercise Physiology Area of Emphasis

Code	Title	Hours
A grade of B- or higher must be earned in all required courses.		
EXPH 661	Clinical Research Methods 1	1
EXPH 662	Clinical Research Methods 2	1
EXPH 670	Lab Techniques and Methods 2	3
EXPH 680	Advanced Clinical Exercise Physiology	3
EXPH 681	Clinical Exercise Prescription	5
EXPH 695	Independent Study	2
Total Hours		15

Research Exercise Physiology Area of Emphasis

Code	Title	Hours
A grade of B- or higher must be earned in all required courses.		
EXPH 682	Research Design and Methods	4
STAT 511	Statistical Methods 1	3-4
or AGBI 514	Animal Biotechnology	
Journal Club		2
EXPH 777	Journal Club	
EXPH 698	Thesis or Dissertation	5
Total Hours		14

Tactical Performance Physiology Area of Emphasis

Code	Title	Hours
A grade of B- or higher must be earned in all required courses.		
EXPH 564	Applied Biomechanics	3
EXPH 601	Tactical Performance Assessment and Monitoring 1	2
EXPH 602	Tactical Performance Assessment and Monitoring 2	2
EXPH 610	Environmental Exercise Physiology	3
or EXPH 667	Advanced Exercise Nutrition	
EXPH 669	Advanced Strength and Conditioning Methods	3
NSCA Tactical Strength and Conditioning-Facilitator Certification		

Major Learning Outcomes

MASTER OF SCIENCE (MS) IN EXERCISE PHYSIOLOGY

Master of Science (MS) in Exercise Physiology

The Exercise Physiology MS program prepares students for exciting careers in healthcare, human performance, research, or professional programs. Students select an Area of Emphasis (AoE) in one of three specializations: Clinical Exercise Physiology, Tactical Performance Physiology, or Research Exercise Physiology.

The Clinical Exercise Physiology AoE trains students to use exercise testing and prescription for persons with diseases, including obesity, cardiovascular disease, diabetes, Parkinson's, and aging. Graduates of the Clinical AoE will become Clinical Exercise Physiologists competitive for careers in healthcare, rehabilitation, fitness, or academic settings; many graduates also pursue professional programs (e.g., Medical School, Physician's Assistant, Physical Therapy).

The Tactical Performance Physiology AoE prepares students to optimize the readiness and resiliency of tactical professionals (e.g., military, firefighter, and law enforcement officers). Graduates of the Tactical Performance AoE can become Tactical Strength and Conditioning Coaches or Human Performance Specialists who work with military or fire/police departments or apply to professional programs (e.g., Athletic Training, Physical Therapy).

The Research Exercise Physiology AoE trains students to conduct research across a variety of disciplines (e.g., cardiovascular disease, musculoskeletal disorders, and biomechanics/rehabilitation) with a focus on the impact of exercise on disease states. Graduates of the Research AoE can pursue careers in research and academia or additional training in research intensive doctoral or professional programs.

Learning Objectives for Research Exercise Physiology Area of Emphasis

To prepare research based exercise physiologists who:

1. Demonstrate proficiency in applying theories, and knowledge to address fundamental questions in health specific issues related to exercise physiology
2. Develop technical skills for conducting experimental procedures.
3. Develop skills in critical thinking in order to state research hypotheses, and to analyze and interpret research data using appropriate methodology and statistics.
4. Demonstrate skills in scientific written and oral communication.
5. Develop and apply key scientific traits such as professionalism and integrity, while understanding the principles of ethics associated with appropriate research conduct.

Learning Objectives for Clinical Exercise Physiology Area of Emphasis

To prepare clinical exercise physiologists who:

1. Are proficient, evidence-based and patient-centered exercise physiology professionals.
2. Demonstrate effective collaboration in an interprofessional healthcare model.
3. Demonstrate integrative and critical thinking skills to allow application of scientific knowledge for clinical applications.
4. Demonstrate professionalism and career skills in clinical settings.
5. Demonstrate proficiency in modern applications in patient care.

Learning Objectives for Tactical Performance Physiology Area of Emphasis

Students who complete the Tactical Performance AoE will be able to:

1. Integrate and apply foundational knowledge (e.g. human physiology, exercise physiology, environmental physiology, nutrition, and principles of strength and conditioning) in the area of tactical performance.
2. Design and implement evidence-based strength and conditioning programs and recovery modalities to improve overall health and performance in tactical populations.
3. Examine and interpret clinical (e.g. cardiovascular risk factors, muscular imbalances) and performance (e.g. muscular strength, power, and endurance) standards for tactical populations.
4. Demonstrate written and oral communication and critical thinking skills by analytically critiquing novel research in exercise physiology and tactical performance sciences.

5. Demonstrate proficiency in applying theories and knowledge to address fundamental questions in exercise physiology specific issues related to the tactical athlete.
6. Demonstrate integrative and critical thinking skills to lead or facilitate the application of scientific knowledge in tactical domains.

Accreditation

The Bachelor of Science and Master of Science (Clinical) programs in Exercise Physiology are accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP (<https://www.caahep.org/>)).