Doctor of Science in
Health Science
Neurologic Rehabilitation

Thomas Cappaert, PhD, ATC, CSCS
Professor & Director of Post Professional Research
tcappaert@rmuohp.edu

Kristen Johnson, PT, EdD, MS, NCS
Concentration Track Director
kjohnson@rmuohp.edu

Curriculum

The vision of Rocky Mountain University of Health Professions (RMUoHP) is to become widely recognized for excellence in healthcare education. The Doctor of Science (DSc) in Health Science with clinical concentration areas in Athletic Training, Clinical Electrophysiology, Health Promotion and Wellness, Human & Sport Performance, and Neurologic Rehabilitation develops evidence-based clinician-scientists with advanced clinical skills who can critically evaluate the literature and participate in the research process through identification of best practice in the concentration area and apply that to independent clinical research.

The core and concentration courses are designed to enhance clinical, research, teaching, and leadership skills. The program is designed for practitioners and educators to continue professional work obligations during the program while attending eight to ten semesters of didactic work followed by completion of a dissertation. The dissertation will emphasize the application of scientific principles related to the application of evaluation, intervention and research of clinical problems seen in healthcare and education.

The purpose of the DSc in Health Science program is to prepare professionals from healthcare related fields as master clinicians, researchers, leaders, and educators. The program provides students with the ability to make contributions by publishing in peer-reviewed journals and/or presenting research at professional conferences. Students planning to enter an academic career will learn skills for effective teaching in academic healthcare programs.

Degree Objectives
The DSc in Health Science Program is committed to the development of the healthcare professional who can:

- Conduct and disseminate clinically sound, ethical, cost-effective research;
• Make significant and relevant contributions to the current body of scientific knowledge in the discipline;
• Develop knowledge expertise in the area of dissertation interest;
• Influence ethical and legal management of healthcare through education of providers, consumers, and society at large;
• Enhance leadership abilities, including competence in the roles of clinician, researcher, educator, and leader;
• Describe and distinguish the various theories associated with the concentration area.

Curriculum

Core Courses: All students are required to complete research methods/biostatistics courses as well as required theory courses. These courses provide the foundation for the concentration courses and the research process.

Concentration Courses: Students are required to select a concentration area before enrolling in the DSc program. Concentration courses are generally in the specific area of the research that the student will pursue.

Concentrations:

• Athletic Training
• Clinical Electrophysiology
• Health Promotion & Wellness
• Human & Sport Performance
• Neurologic Rehabilitation

Admission Requirements

1. Have either a clinical entry-level master’s (MSPT, MPT, MOT), entry-level doctor of physical or occupational therapy (DPT, OTD), or transitional doctor of physical or occupational therapy degree from an accredited college or university (t-DPT, T-OTD). A clinical entry-level bachelor’s degree or an entry-level PT certificate with a master’s degree in a non-related field may also acceptable.
2. Other health care professionals with requisite educational preparation will be considered on a case-by-case basis.
3. Current state professional licensure.
4. Have a grade point average of 3.2 (on a 4.0 scale) on all work completed during the Master's degree.
5. Possess writing and oral communication skills sufficient to conduct and deliver the results of meaningful research. Must submit an essay that includes current personal, intellectual and professional interests and why the student is applying to the degree program.
6. Submit a current Curriculum Vita.
7. Possess information technology skills sufficient to effectively participate in RMUoHP’s DSc program.
8. Possess information technology skills sufficient to effectively conduct research.
9. Have successfully completed, with a grade of B- or better, at least one course in Research Methods or Statistics at the Master's or higher level.

Concentration – Neurologic Rehabilitation
The Neurologic Rehabilitation concentration includes a diverse curriculum designed to aid the professional in the development of further knowledge, skills and abilities essential for obtaining maximum recovery or acquisition of function for individuals with neurological deficits. The curriculum builds upon each professional’s clinical degree and expertise with rigorous coursework in evidence-based practice, rehabilitation systems physiology, applied neuroscience/neurophysiology, motor control and learning, clinical technology, and advanced neurologic interventions. This concentration is committed to the development of lifelong scientific scholars who can conduct, evaluate and integrate research findings into their daily academic agenda and/or clinical practice; act in leadership roles in their discipline and community; provide the highest level of intervention to their patients/clients; and participate in graduate education environments to teach the next generation of clinical scientists and educators. This doctoral program will prepare scientific scholars that can function as clinicians, researchers, or academicians.
<table>
<thead>
<tr>
<th>Semester</th>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sum 2016</td>
<td>May 2, 2016</td>
<td>June 8-12, 2016</td>
<td>August 19, 2016</td>
</tr>
<tr>
<td>2 Fall 2016</td>
<td>August 29, 2016</td>
<td>ONLINE</td>
<td>December 16, 2016</td>
</tr>
<tr>
<td>3 Win 2017</td>
<td>January 9, 2017</td>
<td>February 9-12, 2017</td>
<td>April 28, 2017</td>
</tr>
<tr>
<td>5 Fall 2017</td>
<td>September 5, 2017</td>
<td>November 2-5, 2017</td>
<td>December 22, 2017</td>
</tr>
<tr>
<td>6 Win 2018</td>
<td>January 8, 2018</td>
<td>February 28-March 4, 2018</td>
<td>April 27, 2018</td>
</tr>
<tr>
<td>7 Sum 2018</td>
<td>May 7, 2018</td>
<td>June 14-18, 2018</td>
<td>August 24, 2018</td>
</tr>
<tr>
<td>8 Fall 2018</td>
<td>September 4, 2018</td>
<td>November 2-4, 2018</td>
<td>December 21, 2018</td>
</tr>
<tr>
<td>Winter 2019</td>
<td></td>
<td>CC 833A</td>
<td></td>
</tr>
<tr>
<td>Summer 2019</td>
<td></td>
<td>CC 833B</td>
<td></td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td>Student must register for Residency Credit (CC 877A, CC 877B, etc.) each semester until dissertation is completed &amp; minimum credit requirement for program is attained.</td>
<td></td>
</tr>
</tbody>
</table>

_Eight-year deadline from start of program is May 2, 2024_
Semester 1
(7 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2, 2016</td>
<td>June 8-12, 2016</td>
<td>August 19, 2016</td>
</tr>
</tbody>
</table>

HS 710  Evidence-based Practice  (3 credits; 2 days On-site)
This course is designed to prepare healthcare professionals with the knowledge, skills and abilities necessary to make independent judgments about the validity of clinical research and to implement evidence-based clinical practice in their careers. This course will focus on the concepts of evidence-based practice with emphasis on forming answerable clinical questions and effective literature search strategies. The evaluative approach to appraising the research literature will prepare the students to judge the evidence on: 1) the accuracy and validity of diagnostic tests and the application of important diagnostic tests in the care of a specific patient; 2) the effectiveness of clinical interventions; 3) the natural history of health-related conditions; 4) risk of harm from select preventative and therapeutic interventions. Based on presentation of case scenarios, students will be required to formulate the key question(s), rapidly search medical and health-related databases, appraise the evidence with a critical analysis and describe application of the evidence in a clinical context. Instructor: Patrick McKeon, PhD, ATC, CSCS; Jennifer McKeon, PhD, ATC, CSCS

HS 712  Research Methods:  (3 credits; 2 days On-site)
A Quantitative Approach
This course provides an introduction to general research principles and research ethics. The student will be introduced to the following topics in the research process: question formulation, principles of measurement, basic design and methodological features, issues of reliability and validity, and fundamentals of conducting a literature review. A quantitative article critique will be conducted in class and outside of class. The class format will include lecture, small group discussion, and practice. Instructor: Shane Koppenhaver, PT, PhD, OCS, FAAOMPT

HS 714  Scientific/Professional Writing  (1 credit; Online)
This pass/fail course reviews PubMed, Index Medicus, other search methodologies, American Medical Association Manual of Style editorial format, the composition of a scientific/professional manuscript, and the style of Scientific/professional writing, its construction and formats. Instructor: Lori Thein Brody, PhD, PT, SCS, ATC

Content and dates are subject to change.
Semester 2
(5 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 29, 2016</td>
<td>ONLINE</td>
<td>December 16, 2016</td>
</tr>
</tbody>
</table>

HS 760 Instructional Technology  
(2 credits; Online)  
This course identifies, explores, and practices the use of instructional technology in the design and delivery of online, blended, and traditional classroom learning environments. Best practices for online and blended course design and strategies for online instructional delivery will be discussed. Current instructional technologies utilized in the 21st century higher education classroom will be systematically design, created, shared, and reviewed. Instructor: Jan Reese, MS

WE 622 Introduction to Health Promotion and Wellness & Risk Reduction Strategies  
(3 credits; Online)  
This course will provide an overview of the concepts of health promotion, health education, public health, primary prevention, lifestyle, behavior, and wellness and, based on evidence, their relationships to each other and to secondary and tertiary care. The historical relevance of and evidence for focusing on individual and social determinants of health will be explored and an ecological model combining both approaches will be introduced. The evidence related to risk factors for disease due to lifestyle choices will be reviewed and discussed in this course, including but not limited to smoking, nutritional choices, obesity, inactivity, diabetes, social support, and stress. Evidence for the prevention of diseases through the adoption of healthy behaviors will also be discussed. Strategies for adopting positive health-related behaviors will be explored. Class format will include lecture, small group activities and projects, and a personal wellness philosophy presentation. Instructor: Andrea Gorman, PhD, RD, LPC

Semester 3
(6 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 9, 2017</td>
<td>February 9-12, 2017</td>
<td>April 28, 2017</td>
</tr>
</tbody>
</table>

HS 720 Survey of Qualitative Research  
(3 credits; 2 days On-site)  
This course introduces the student to qualitative research methods and their applications to problems and phenomena in healthcare. Emphasis is placed on the appropriate use and differences of qualitative methods, their philosophical underpinnings, and application to clinical issues. Instructor: Angela R. Merlo, PT, DPT, PhD

HS 722 Biostatistics 1  
(3 credits; 2 days On-site)  
The purpose of this course is to introduce the student to biostatistics, the science of evaluating information in a biological setting. Such topics as simple descriptive statistics, basic probability concepts, probability distributions (normal & binomial),

Content and dates are subject to change.
sampling distributions, and an introduction to t-distributions will be covered. Instructor: Tom Cappaert, PhD, ATC, CSCS

Semester 4
(6 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 8, 2017</td>
<td>ONLINE</td>
<td>August 25, 2017</td>
</tr>
</tbody>
</table>

HS 732   Biostatistics 2  
(3 credits; Online)
The purpose of this course is to build upon the topics introduced in Biostatistics 1. This course will cover such topics as interval estimation, confidence intervals, hypothesis tests, and one and two-sample t-tests. **Prerequisite:** HS 722. Instructor: Tom Cappaert, PhD, ATC, CSCS

OR

HS 734   Qualitative Research 2  
(3 credits; Online)
This course is the second in a two-course sequence on qualitative research methods that extends and elaborates on the topics covered in HS 720. Major approaches used in conducting qualitative research and the application of these methods to problems and phenomena in healthcare will be examined. The emphasis of the course is on the collection, management, analysis, and interpretation of qualitative data. Exploration and application of topics such as sampling, interviewing and observation techniques, data analysis methods, and reporting of qualitative research will be addressed. Evaluation and critique of research studies utilizing qualitative methods will also be examined. **Prerequisite:** HS 720. Instructor: Angela R. Merlo, PT, DPT, PhD

N 720   Neuroscience Systems  
(3 credits; Online)
This course will focus on the structure and function of the central nervous system. It is designed to provide a survey of the functional components of the nervous system and an understanding of the functional brain at a systems level; specifically integrate aspects of neuroanatomy with physiology to allow association of brain areas with the various functions. Items to be discussed include the areas and mechanisms of the brain that process sensory and motor information. The brain's reaction to sensory input as well as the ability of the brain to adapt and change as a result of input will be highlighted. In addition, various diseases/injuries will be explored to provide an understanding of normal and pathophysiological brain function. Instructor: Kristen Johnson, PT, EdD, MS, NCS

Content and dates are subject to change.
Semester 5
(9 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 5, 2017</td>
<td>November 2-5, 2017</td>
<td>December 22, 2017</td>
</tr>
</tbody>
</table>

HS 730 Epidemiologic Methods (3 credits; 1.5 days On-site)
This course will introduce the student to important epidemiological methodology/concepts commonly used in evidence-based practice/medicine. The course will focus on the common observational designs, and common measures of disease frequency, risk association, and validity of diagnostic tests. The use and construction of receiver operating curves will be discussed. The course will also include an introduction into logistic regression and survival analysis methods in how they apply to disease outcomes/disorders. Students will conduct and apply basic epidemiological concepts using statistical software, and learn how to design and develop. The student will be provided with information to aid in data collection and management. Prerequisite: HS 710. Instructor: Jason Brummitt, PT, PhD, ATC, CSCS

HS 752 Curriculum Development (2 credits; Online)
This course examines various classical and modern curriculum theorists as they apply curriculum development. Emphasis is placed on congruence between institutional mission, philosophy, and goals; professional standards; and needs and expectations of a program’s communities of interest. Students design a curriculum to meet the needs of a stated role and setting. Instructor: Kristen Johnson, PT, EdD, MS, NCS

N 722 Clinical Neuroscience and Contemporary Motor Models (3 credits, 1.5 days On-site)
This course will serve to review, update, and synthesize evidence from the neurosciences as a foundation for clinical practice, as well as explore the fundamental principles, limitations, and clinical implications of the theories of motor control and motor learning influencing clinical practice. It will include the incorporation of constructs from motor learning and motor control theories into therapeutic intervention for individuals with a variety of movement problems resulting from neurological dysfunctions. Trends in models of service delivery: medical, educational, community, and social models, will be analyzed and approached from a modern evidence-based perspective. Instructor: TBD

Semester 6
(8 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 8, 2018</td>
<td>February 28-March 4, 2018</td>
<td>April 27, 2018</td>
</tr>
</tbody>
</table>

HS 740 Teaching and Learning Theory (3 credits; 2 days On-site)
This course incorporates a learner centered approach to course development and instructional delivery based on the best evidence of how people learn. Students will
demonstrate both traditional and innovative instructional techniques and strategies for teaching in didactic and clinical settings based upon the evidence-base of best teaching practices. Instructor: Malissa Martin, EdD, ATC

**HS 800   Dissertation Prep I**  (2 credits; 1 day On-site)
The conduct of scientific inquiry requires careful planning and forethought to assure the eventual implementation of a study will successfully result in interpretable and meaningful measurements and that valid conclusions may be drawn. This course will provide students with the necessary background and experience to formulate a clearly delineated hypothesis/research question-driven dissertation prospectus that can be used to convince funding agencies and/or doctoral committees to support the study. Emphasis will be placed on developing a clear background, scientific/clinical rationale, and hypothesis/research question along with the start of a methods section and strategies to form a dissertation committee. In addition, this course will provide key information about the responsible conduct of research, the informed consent process, and the Institutional Review Board process so the student will be able to design a safe and ethical environment for their volunteer subjects. Instructor: Brent Alvar, PhD, CSCS*D, RSCC*D, FNSCA, FACSM

**N 724   Neurological Screenings and Outcomes Assessment**  (3 credits, 1.5 days On-site)
This course will explore the selection, utilization, and interpretation of screening and outcome assessments within the current healthcare environment including standardized tools for assessment of health status based on the validity, reliability and responsiveness of the instrument, and how the assessments relate to the International Classification of Functioning, Disability, and Health (ICF) model. Instructor: TBD

**Semester 7**
(8 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 7, 2018</td>
<td>June 14-18, 2018</td>
<td>August 24, 2018</td>
</tr>
</tbody>
</table>

**AT 670   Learning Assessment and Evaluation**  (3 credits; 1.5 days On-site)
This course examines a variety of assessment models and techniques used to evaluate student classroom performance, student clinical performance, instructor performance and educational programs. Students will design and execute assessment plans, interpret assessment data and develop continuous improvement plans. Instructor: Scott Heinerichs, EdD, LAT, ATC

**HS 727   Survey Mixed Methods Research**  (3 credits; 1 day onsite)
This course will familiarize students with theory and application of survey research design and methods with integration of a mixed methods approach. Students will learn the principles and practices of conducting survey research including: accounting for and reducing sources of error, designing appropriate sampling strategies, assessing the reliability and validity of self-constructed questionnaires and interview protocols,
administering surveys through various means and analyzing and reporting results of survey research. How to integrate qualitative inquiry with survey research to develop and conduct a mixed method study including writing results will be emphasized.

Instructor: TBD

**N 727 Advanced Neurologic Practice-Part I** (3 credits; 1.5 days On-site)
This course will focus on comprehensive management of the individual with stroke, traumatic brain injury, brain tumor, and neurodegenerative disorders. The pathophysiology, pharmacology, and imaging will be used to design evidence-based interventions, grounded in the International Classification of Functioning, Disability, and Health (ICF) framework, that foster advanced clinical decision making for prediction, prevention, plasticity, and participation in physical therapy practice.

Instructor: TBD

**Semester 8**
(4 credits)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>On-site Dates</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 4, 2018</td>
<td>November 2-4, 2018</td>
<td>December 21, 2018</td>
</tr>
</tbody>
</table>

**HS 810 Dissertation Prep II** (1 credit; 1 day On-site)
This course is a continuation of HS800 Dissertation Prep I where students will finalize their written prospectus. Students will continue securing dissertation committee commitments and be prepared to defend a mock prospectus defense via presentation while on campus. Students prepare for the Institutional Review Board process by completing the CITI Human Subjects Research course, becoming familiar with the online submission platform, and drafting informed consent documents. Instructors: Brent Alvar, PhD, CSCS*D, RSCC*D, FNSCA, FACSM

**N 729 Advanced Neurologic Practice-Part II** (3 credits; 1.5 days On-site)
This course will focus on the comprehensive management of the individual with spinal cord injury, demyelinating and vestibular disorders. The pathophysiology, pharmacology, and imaging will be used to design evidence-based interventions, grounded in the International Classification of Functioning, Disability, and Health (ICF) framework, that foster advanced clinical decision making for prediction, prevention, plasticity, and participation in physical therapy practice. Instructor: TBD

**Dissertation Phase**
*(Eight-year deadline from start of program to complete degree)*

(12-credit minimum)

Each doctoral student will be required to complete a dissertation that is evidence-based and involves applied research of experimental, nonexperimental, or descriptive designs. Examples of dissertations include: small randomized control trials; single-case/subject designs, quasi-experimental designs, qualitative methods, survey research, etc.
epidemiological designs (cross-sectional, cohort or case-control) normative research, and correlational designs.

In 9th semester students will complete comprehensive exams

CC 833A   Doctoral Dissertation 1 – Semester 9  (6 credits)
CC 833B   Doctoral Dissertation 2 – Semester 10  (6 credits)

Semesters of Dissertation Residency Credit (CC 877A, CC 877B, etc.) as needed