EXERCISE SCIENCE, PHD

School of Health and Kinesiology, College of Education, Department of Biomechanics, College of Education

Vision Statement
The doctoral degree in Exercise Science at the University of Nebraska at Omaha (UNO) is a joint program between the Department of Biomechanics and the School of Health and Kinesiology. The degree is based on the physiology, biochemistry, biomechanics, motor control and development, and biopsychosociology of human movement. The program is aimed at improving movement function and physical activity level using evidence-based approaches through interdisciplinary clinical and translational research. A problem-solving approach is used across the age and health spectrum for disease prevention, health enhancement, physical rehabilitation, and exercise motivation. The program offers four areas of concentration in biomechanics, physiology of exercise, motor development, and control, and physical activity.

Program Contact Information
Dr. Danae Dinkel, Doctoral Program Chair (DPC)
School of Health and Kinesiology (H&K) 207
402-554-2670
dmdinkel@unomaha.edu

Program Email Address (unohk@unomaha.edu)
Laura Campbell, Administrative Coordinator
Biomechanics Research Building (BRB) 100
402-554-3228
lecampbell@unomaha.edu

Program Website (https://www.unomaha.edu/college-of-education/biomechanics-core-facility)

Admissions

Application Deadlines
Applications for this program are accepted on a rolling basis. All materials must be submitted prior to the beginning of the semester in which the student has elected to begin coursework.

Program-Specific Requirements
- GPA of 3.2 in Master’s program or in the last 30 hours of previous graduate work
- Master’s degree, or minimum of 30 graduate hours in a related field, e.g., health, physical therapy
- For applicants whose native language is not English, score of 550 paper-based, 213 computer-based, 80 internet-based, 6.5 IELTS, or a 53 PTE is required, with a score of at least 20 in all categories (listening, reading, writing, and speaking)
- GRE Score:
  - Total score (verbal and quantitative) of at least 297 if GRE was taken after August 2011; total score (verbal and quantitative) of at least 1000 if GRE was taken before August 2011. Exam and scores must have been taken within the last three (3) years.
  - Three (3) Letters of Recommendation
- Statement of Purpose:
  - Needs to state goals and objectives for seeking the degree.
  - Students will identify their intended area of focus and the name of the faculty advisor with whom they wish to work (maximum 500 words).
- Writing Sample:
  - If any scientific papers were published with the student’s name listed first among authors, then they should be submitted.
  - Undergraduate Course Deficiencies: these courses are determined by the student’s mentor in collaboration with their supervisory committee. Each student’s individual deficiency courses will be approved in their plan of study.
- Approval by a faculty member willing to act as advisor and mentor to the student. The applicant is expected to contact a potential advisor to determine if a suitable match in interests exists. This assures that the student will be able to develop a program of study that meets the specific goals intended.

Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE 9041</td>
<td>ADVANCED STATISTICS ¹</td>
<td>3</td>
</tr>
<tr>
<td>PE/BMCH 9910</td>
<td>DOCTORAL SEMINAR</td>
<td>3</td>
</tr>
<tr>
<td>HPER 9031</td>
<td>RESEARCH IN HEALTH, PHYSICAL EDUCATION RECREATION ¹</td>
<td>3</td>
</tr>
</tbody>
</table>

Take the following course for a minimum of 15 credit hours: ²

| PE/BMCH 9910       | DOCTORAL SEMINAR                          |         |

Concentrations

See Exercise, PhD Concentrations

| PE/BMCH 9990       | DISSERTATION                               | 15      |

Total Credits

| 60 |

¹ If HPER 9031 and PE 9041 (or equivalent courses) have previously been taken, additional research core courses must be taken in order to meet the 21-hour requirement.

² This seminar is designed to enhance success in academia and maximize the student’s research experiences. The student will be required to register for 3 credit hours per semester. In these credit hours the student will attend formal reading clubs with the advisor where he/she will be engaged in reviewing the related literature via journal articles, conducting research projects, reviews of literature, meta-analyses, etc. In addition, the student will be taught how to write successful grants and develop a successful line of research. Each semester the student will have to produce as the graded outcome a manuscript based on data acquired in the laboratory from the ideas developed in the seminar or submit a grant that will support the research ideas developed. Ethical training will be offered as part of the seminar hours. In their first year, all doctoral students will be required to attend a training session on scientific integrity and the responsible conduct in research. A complementary, mandatory, web-based component will be completed before the didactic material. This component is offered through the UNMC IRB office and provides an extensive literature-based review of the topics, allowing interactive “chat-room” discussion of a series of relevant case-based problems.

Exit Requirements

- Comprehensive Examination
- Dissertation

Program-Related Information

- Advisor and Supervisory Committee
- Preliminary contact is made with a potential advisor prior to applying to the program. Once admitted, a student is assigned an advisor based on the match in interests with those of the advisor and willingness of the advisor to take on the student.
- In the students first year, the student must form a Supervisory Committee. It should consist of at least four Exercise Science affiliated graduate faculty members including the faculty advisor, one of whom must be from a department different than that of the
dissertation advisor. The Dean for Graduate Studies at UNO will appoint the committee upon recommendation of the advisor. The committee will be responsible for approving the program of study, comprehensive exam, dissertation proposal, dissertation and its oral defense.

- **Program of Study (must have 45 hours remaining after approval)**
  - The student and his/her advisor will determine the Program of Study, including the required courses and general area of research for the dissertation. This Program of Study is subject to final approval from the student's doctoral supervisory committee. After this approval, the student will submit the Program of Study form with course information to the Graduate Studies Office.

- **Comprehensive Exam**
  - The required comprehensive exam will be taken towards the end of the student's coursework. The Supervisory Committee, in conjunction with the student will determine the nature of the exam; the exam could include a take-home exam followed by an oral defense, or writing an NIH-type grant followed by an oral exam. The Supervisory Committee will evaluate the exam.

- **Dissertation Proposal Form**
  - Within one year of successfully completing the comprehensive exam and being admitted to candidacy, a formal research proposal for the dissertation topic should be presented to the Supervisory Committee. The format of the proposal is subject to approval by the advisor and the supervisory committee. The proposal could include a formal written proposal with an oral defense or oral presentation of the proposed research project.

- **Dissertation**
  - After successfully completing the comprehensive exam and being admitted to degree candidacy, the student must register for at least one credit hour of dissertation for each semester until completion of the degree. A minimum of 15 hours of dissertation credit must be included in the course of the degree.
  - It is expected that the dissertation will result in manuscript submissions in referred journals in the discipline.

- **Residency**
  - The residency will be reasonably compact, continuous, and coherent, and a substantial portion done at and under close supervision of the University. Most of the students in the program will be full-time and continuously enrolled.

### Concentrations

#### Physiology of Exercise Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE 9951/8950</td>
<td>ADVANCED EXERCISE PHYSIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>PE 9960</td>
<td>ADVANCED EXERCISE PHYSIOLOGY II</td>
<td>3</td>
</tr>
<tr>
<td>HPER 9851/8850</td>
<td>EXERCISE FOR SPECIAL POPULATIONS</td>
<td>3</td>
</tr>
<tr>
<td>PE 8076</td>
<td>OPTIMIZING SPORTS PERFORMANCE</td>
<td>3</td>
</tr>
<tr>
<td>PE 8086</td>
<td>CLINICAL EXERCISE PHYSIOLOGY</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Electives

Select 9 hours from the following:

- BMCH 9451/8450 ADVANCED BIOMECHANICS
- BMCH 9460 ADVANCED BIOMECHANICS II
- PE 9810 HIGHER EDUCATION TEACHING SEMINAR
- BMCH 9411/8410 MOTOR CONTROL I
- BMCH 9510 MOTOR CONTROL II
- BIOL 8146 CELLULAR BIOLOGY
- BIOL/CHM 8654 BIOCHEMISTRY I LABORATORY
- BIOL/CHEM 8664 BIOCHEMISTRY II LABORATORY
- PE 8120 CURRENT TOPICS IN WEIGHT MANAGEMENT
- PE 9131/8130 IMPLEMENTING PHYSICAL ACTIVITY IN DIVERSE POPULATIONS
- PE 9141/8140 PHYSICAL ACTIVITY ASSESSMENT AND HEALTH RELATED RESEARCH
- PE 8206 PLANNING WORKSITE WELLNESS PROGRAM
- PE 8240 SPORT IN AMERICAN CULTURE
- PE 8280 CURRICULUM IN PE
- PE 8460 OCCUPATIONAL BIOMECHANICS
- PE 8506 BEHAVIORAL ASPECTS OF COACHING
- PE 8800 RISK MGT HLTH/FIT PROFESSIONALS
- PE 8856 CARDIOVASCULAR DISEASE PREVENTION & REHABILITATION
- PE 8700 PSYCHOLOGY OF PHYSICAL ACTIVITY
- PE 8910 INTERNSHIP IN EXERCISE SCIENCE
- PE 8966 TOPICS IN SPORTS MEDICINE
- PE 9820 SERVICE EXPERIENCE IN HIGHER EDUCATION
- BMCH 9401/8400 MOTOR LEARNING I
- BMCH 9421/8420 MOTOR DEVELOPMENT
- BMCH 9500 MOTOR LEARNING II
- HPER 8000 SPECIAL STUDIES
- HPER 8100 RESEARCH PROJECT
- HPER 8220 PROBLEMS & ISSUES IN HPER
- HPER 8300 ANALYSIS OF RESEARCH AND LITERATURE IN HUMAN MOVEMENT
- HPER 8500 QUALITATIVE RESEARCH METHODS
- BIOC 827 Metabolic Regulatory Mechanisms

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCH 9451</td>
<td>ADVANCED BIOMECHANICS</td>
</tr>
<tr>
<td>BMCH 9460</td>
<td>ADVANCED BIOMECHANICS II</td>
</tr>
<tr>
<td>BMCH 9500</td>
<td>MOTOR LEARNING II</td>
</tr>
<tr>
<td>BMCH 9510</td>
<td>MOTOR CONTROL II</td>
</tr>
<tr>
<td>PHYS 8455</td>
<td>CLASSICAL MECHANICS</td>
</tr>
</tbody>
</table>

### Biomechanics Concentration

#### Required Courses

- BMCH 9451 ADVANCED BIOMECHANICS
- BMCH 9460 ADVANCED BIOMECHANICS II
- BMCH 9500 MOTOR LEARNING II
- BMCH 9510 MOTOR CONTROL II
- PHYS 8455 CLASSICAL MECHANICS

#### Electives

Select 9 hours from the following:

- BMCH 9421 MOTOR DEVELOPMENT
- BMCH 9401 MOTOR LEARNING I
- BMCH 9411 MOTOR CONTROL I
- BMCH 9101 NONLINEAR ANALYSIS FOR MOVEMENT STUDIES
- BMCH 9201 MATLAB FOR MOVEMENT SCIENCES
- BSNE 814 Medical Imaging Systems
- BSNE 912 Advanced Diagnostic Ultrasound Imaging
- CEEN 8336 Microprocessor System Design
- CEEN 8366 Embedded Microcontroller Design
- CIP 814 Scientific Writing
- CIP 817 Applied Scientific Writing
### Motor Development and Control Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCH 9401</td>
<td>MOTOR LEARNING I</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9411</td>
<td>MOTOR CONTROL I</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9201</td>
<td>MATLAB FOR MOVEMENT SCIENCES</td>
<td></td>
</tr>
<tr>
<td>BMCH 9451</td>
<td>ADVANCED BIOMECHANICS</td>
<td></td>
</tr>
<tr>
<td>BMCH 9460</td>
<td>ADVANCED BIOMECHANICS</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9500</td>
<td>MOTOR LEARNING II</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9510</td>
<td>MOTOR CONTROL II</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9101</td>
<td>NONLINEAR ANALYSIS FOR MOVEMENT STUDIES</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Required Courses

- BMCH 9421/8420 MOTOR DEVELOPMENT
- BMCH 9460 ADVANCED BIOMECHANICS II
- BMCH 9500 MOTOR LEARNING II
- BMCH 9510 MOTOR CONTROL II
- BMCH 9101 NONLINEAR ANALYSIS FOR MOVEMENT STUDIES

#### Electives

Select 9 hours from the following:

- BMCH 9401 MOTOR LEARNING I
- BMCH 9411 MOTOR CONTROL I
- BMCH 9201 MATLAB FOR MOVEMENT SCIENCES
- BMCH 9451 ADVANCED BIOMECHANICS
- BMCH 9460 ADVANCED BIOMECHANICS
- BMCH 9460 ADVANCED BIOMECHANICS
- BMCH 9500 MOTOR LEARNING II
- BMCH 9510 MOTOR CONTROL II
- BMCH 9101 NONLINEAR ANALYSIS FOR MOVEMENT STUDIES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCH 9401</td>
<td>MOTOR LEARNING I</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9411</td>
<td>MOTOR CONTROL I</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9201</td>
<td>MATLAB FOR MOVEMENT SCIENCES</td>
<td></td>
</tr>
<tr>
<td>BMCH 9451</td>
<td>ADVANCED BIOMECHANICS</td>
<td></td>
</tr>
<tr>
<td>BMCH 9460</td>
<td>ADVANCED BIOMECHANICS</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9500</td>
<td>MOTOR LEARNING II</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9510</td>
<td>MOTOR CONTROL II</td>
<td>3</td>
</tr>
<tr>
<td>BMCH 9101</td>
<td>NONLINEAR ANALYSIS FOR MOVEMENT STUDIES</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total Credits

Total Credits: 24
### Physical Activity Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE 9131/8130</td>
<td>IMPLEMENTING PHYSICAL ACTIVITY IN DIVERSE POPULATIONS</td>
<td>3</td>
</tr>
<tr>
<td>PE 9141/8140</td>
<td>PHYSICAL ACTIVITY ASSESSMENT AND HEALTH RELATED RESEARCH</td>
<td>3</td>
</tr>
<tr>
<td>HPER 9851/8850</td>
<td>EXERCISE FOR SPECIAL POPULATIONS</td>
<td>3</td>
</tr>
<tr>
<td>PE 9701/8700</td>
<td>PSYCHOLOGY OF PHYSICAL ACTIVITY</td>
<td>3</td>
</tr>
<tr>
<td>PE 9040</td>
<td>PHYSICAL ACTIVITY EPIDEMIOLOGY</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 9 hours from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE 8120</td>
<td>CURRENT TOPICS IN WEIGHT MANAGEMENT</td>
<td></td>
</tr>
<tr>
<td>PE 8856</td>
<td>CARDIOVASCULAR DISEASE PREVENTION &amp; REHABILITATION</td>
<td></td>
</tr>
<tr>
<td>PE 9951/8950</td>
<td>ADVANCED EXERCISE PHYSIOLOGY</td>
<td></td>
</tr>
<tr>
<td>PE 9810</td>
<td>HIGHER EDUCATION TEACHING SEMINAR</td>
<td></td>
</tr>
<tr>
<td>PE 9820</td>
<td>SERVICE EXPERIENCE IN HIGHER EDUCATION</td>
<td></td>
</tr>
<tr>
<td>BMCH 9451/8450</td>
<td>ADVANCED BIOMECHANICS</td>
<td></td>
</tr>
<tr>
<td>BMCH 9460</td>
<td>ADVANCED BIOMECHANICS II</td>
<td></td>
</tr>
<tr>
<td>BMCH 9411/8410</td>
<td>MOTOR CONTROL I</td>
<td></td>
</tr>
<tr>
<td>BMCH 9510</td>
<td>MOTOR CONTROL II</td>
<td></td>
</tr>
<tr>
<td>PE 8206</td>
<td>PLANNING WORKSITE WELLNESS PROGRAM</td>
<td></td>
</tr>
<tr>
<td>PE 8240</td>
<td>SPORT IN AMERICAN CULTURE</td>
<td></td>
</tr>
<tr>
<td>PE 8280</td>
<td>CURRICULUM IN PE</td>
<td></td>
</tr>
<tr>
<td>PE 8460</td>
<td>OCCUPATIONAL BIOMECHANICS</td>
<td></td>
</tr>
<tr>
<td>PE 8506</td>
<td>BEHAVIORAL ASPECTS OF COACHING</td>
<td></td>
</tr>
<tr>
<td>PE 8800</td>
<td>RISK MGT HLTH/FIT PROFESSIONSLS</td>
<td></td>
</tr>
<tr>
<td>PE 8910</td>
<td>INTERNSHIP IN EXERCISE SCIENCE</td>
<td></td>
</tr>
<tr>
<td>PE 8966</td>
<td>TOPICS IN SPORTS MEDICINE</td>
<td></td>
</tr>
<tr>
<td>BMCH 9401/8400</td>
<td>MOTOR LEARNING I</td>
<td></td>
</tr>
<tr>
<td>BMCH 9421/8420</td>
<td>MOTOR DEVELOPMENT</td>
<td></td>
</tr>
<tr>
<td>BMCH 9500</td>
<td>MOTOR LEARNING II</td>
<td></td>
</tr>
<tr>
<td>HPER 8000</td>
<td>SPECIAL STUDIES</td>
<td></td>
</tr>
<tr>
<td>HPER 8100</td>
<td>RESEARCH PROJECT</td>
<td></td>
</tr>
<tr>
<td>HPER 8220</td>
<td>PROBLEMS &amp; ISSUES IN HPER</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits** 24
BMCH 8400 MOTOR LEARNING I (3 credits)
Discussion and analysis of scientific principles related to the learning of motor skills; review related literature and research in motor learning. The focus of the course is on recent theories of how movements are acquired and performed, and on factors that have implications for motor learning throughout the life span. (Cross-listed with BMCH 9401)
Prerequisite(s)/Corequisite(s): Department Permission.

BMCH 8410 MOTOR CONTROL I (3 credits)
The focus of the course is to explore the study of the conditions and factors that influence the control and performance of motor skills from both neurophysiological and psychobiological perspectives. (Cross-listed with BMCH 9411)
Prerequisite(s)/Corequisite(s): Department Permission. Not open to non-degree graduate students.

BMCH 8420 MOTOR DEVELOPMENT (3 credits)
This course focuses on the study of motor development, the processes that underlie this development and the factors that influence it. Students will gain an understanding of the major theoretical perspectives of motor development across the life span with special emphasis given in child development. (Cross-listed with BMCH 9421)
Prerequisite(s)/Corequisite(s): Department Permission.

BMCH 8450 ADVANCED BIOMECHANICS (3 credits)
The course will address the biomechanical basis of human performance including mechanical analysis of human gait, fundamental movement patterns and techniques used for collecting biomechanical data. (Cross-listed with BMCH 9451)
Prerequisite(s)/Corequisite(s): BMCH 4630 (Biomechanics) [previously PE 4630] or Instructor Permission.

BMCH 8900 INDEPENDENT RESEARCH IN BIOMECHANICS (1-6 credits)
In this course individuals or groups will conduct research projects for the study and analysis of biomechanical topics. 
Prerequisite(s)/Corequisite(s): Permission of the Department and approval by Faculty Advisor. Not open to non-degree graduate students.

BMCH 8910 INDEPENDENT STUDY IN BIOMECHANICS (1-6 credits)
This is a variable credit course designed for graduate students in Biomechanics who would benefit from independent reading assignments and problems. Independent study enables individual students or a small group of students to focus on topics typically not explored in other offerings or to explore topics currently offered in further depth. (Cross-listed with BMCH 9911)
Prerequisite(s)/Corequisite(s): Graduate student in BMCH and approval by Faculty Advisor. Not open to non-degree graduate students.

BMCH 8990 THESIS IN BIOMECHANICS (1-6 credits)
A research project, designed and executed under the supervision of the chair and approval by members of the graduate student's advisory committee. In this project the student will develop skills in research design, research conduct, data analysis, and reporting. The final product of this course will be an original thesis of independent scientific investigation.
Prerequisite(s)/Corequisite(s): Department Permission. Not open to non-degree graduate students.

BMCH 9031 BIOSTATISTICS IN BIOMECHANICS I (3 credits)
The focus of the course is to prepare students to understand and apply research and biostatistical methods needed in the design and analysis of biomechanical investigations. The major topics to be covered include research design and multiple linear regression. (Cross-listed with BMCH 8030)
Prerequisite(s)/Corequisite(s): Graduate Standing in Biomechanics program or Department Permission.

BMCH 9101 NONLINEAR ANALYSIS FOR MOVEMENT STUDIES (3 credits)
This course is to introduce different nonlinear methods for the analysis of biological and movement time series. Emphasis will be given on understanding the algorithms behind each nonlinear method. (Cross-listed with BMCH 8100)
Prerequisite(s)/Corequisite(s): Instructor Permission

BMCH 9201 MATLAB FOR MOVEMENT SCIENCES (3 credits)
Introduction to Matlab software, plotting data, spectral analysis and the Fourier transform, data smoothing, and image analysis of movement related data. All topics will be implemented using Matlab. (Cross-listed with BMCH 8200)
Prerequisite(s)/Corequisite(s): Instructor permission.

BMCH 9401 MOTOR LEARNING I (3 credits)
Discussion and analysis of scientific principles related to the learning of motor skills; review related literature and research in motor learning. The focus of the course is on recent theories of how movements are acquired and performed, and on factors that have implications for motor learning throughout the life span. (Cross-listed with BMCH 8400)
Prerequisite(s)/Corequisite(s): Department Permission.

BMCH 9411 MOTOR CONTROL I (3 credits)
The focus of the course is to explore the study of the conditions and factors that influence the control and performance of motor skills from both neurophysiological and psychobiological perspectives. (Cross-listed with BMCH 8410)
Prerequisite(s)/Corequisite(s): Department Permission. Not open to non-degree graduate students.

BMCH 9421 MOTOR DEVELOPMENT (3 credits)
This course focuses on the study of motor development, the processes that underlie this development and the factors that influence it. Students will gain an understanding of the major theoretical perspectives of motor development across the life span with special emphasis given in child development. (Cross-listed with BMCH 9420)
Prerequisite(s)/Corequisite(s): PE 2800 (Motor Behavior) or permission of instructor.

BMCH 9451 ADVANCED BIOMECHANICS (3 credits)
The course will address the biomechanical basis of human performance including mechanical analysis of human gait, fundamental movement patterns and techniques used for collecting biomechanical data. (Cross-listed with BMCH 8450)
Prerequisite(s)/Corequisite(s): BMCH 4630 (Biomechanics) [previously PE 4630] or Instructor Permission.

BMCH 9460 ADVANCED BIOMECHANICS II (3 credits)
A comprehensive and advanced detailed investigation of the biomechanics of motor performance in special populations such as stroke, Parkinson's disease, and amputees. Includes advanced study of the mechanical analysis of motor skills and movement patterns and the research techniques for collecting and interpreting biomechanical data. Detailed lectures will cover etiology of such special populations with a focus on the endpoint movement disorders.
Prerequisite(s)/Corequisite(s): BMCH 8450 or BMCH 9451 or Instructor Permission. Not open to non-degree graduate students.

BMCH 9500 MOTOR LEARNING II (3 credits)
The focus of the course is to further explore the study of the conditions and factors that influence the learning and performance of motor skills.
Prerequisite(s)/Corequisite(s): BMCH 8400, BMCH 9401 or Instructor Permission. Not open to non-degree graduate students.

BMCH 9510 MOTOR CONTROL II (3 credits)
The focus of the course is to further explore the study of the conditions and factors that influence the control and performance of motor skills.
Prerequisite(s)/Corequisite(s): BMCH 8410, BMCH 9411 or Department Permission. Not open to non-degree graduate students.
BMCH 9520 MOTOR DEVELOPMENT II (3 credits)
This course focuses on the study of motor development, the processes that underlie this development and the factors that influence it. This course will focus on exploring motor development in clinical populations of people with autism, down syndrome, cerebral palsy, etc. and the factors that influence the progression of motor skills.
Prerequisite(s)/Corequisite(s): BMCH 8420 or permission from instructor.

BMCH 9910 DOCTORAL SEMINAR (3 credits)
The major goal of this course is to teach the graduate student how to write manuscripts/ grants and be an effective academician with strong ethics. The outcome of this course is for the student to produce a manuscript based on data acquired in the laboratory from the ideas developed in the seminar or submit a grant that will support the research ideas developed in at least one semester. The material covered is intended to equip students with the skills necessary to be successful in their academic careers with emphasis given on writing scientific papers. (Cross-listed with PE 9910)
Prerequisite(s)/Corequisite(s): Admission into the PhD program. Not open to non-degree graduate students.

BMCH 9911 INDEPENDENT STUDY IN BIOMECHANICS (1-6 credits)
This is a variable credit course designed for graduate students in Biomechanics who would benefit from independent reading assignments and problems. Independent study enables individual students or a small group of students to focus on topics typically not explored in other offerings or to explore topics currently offered in further depth. (Cross-listed with BMCH 8910)
Prerequisite(s)/Corequisite(s): Graduate student in BMCH and approval by Faculty Advisor. Not open to non-degree graduate students.

BMCH 9990 DISSERTATION (1-15 credits)
The course provides doctoral candidates in Exercise Science with a process to complete a dissertation research plan. The course learning activities will focus on the completion of a candidate’s dissertation. The course is designed to allow advanced doctoral candidates to demonstrate technical mastery of the discipline and to advance knowledge by completing an investigation. (Cross-listed with PE 9990)
Prerequisite(s)/Corequisite(s): Admittance to the UNO Doctoral Program in Exercise Science, successful completion of doctoral coursework & comprehensive exams, approval of the dissertation supervisory committee chair & advancement to candidacy. Not open to non-degree graduate students.

HPER 8000 SPECIAL STUDIES (1-3 credits)
A series of intensive courses - scheduled as regular seminars or workshops according to purpose.
Prerequisite(s)/Corequisite(s): Permission of department.

HPER 8030 RESEARCH IN HEALTH, PHYSICAL EDUCATION AND RECREATION (3 credits)
The course deals with scientific writing, research techniques, statistics, and quantitative research design and technique. Considerable emphasis is placed on evaluation of research in scholarly publications. A research proposal in a form of a master's thesis or doctoral dissertation is written as one of the course requirements. (Cross-listed with HPER 9031)
Prerequisite(s)/Corequisite(s): Graduate standing. Not open to non-degree graduate students.

HPER 8100 RESEARCH PROJECT (1-3 credits)
Individual or group study and analysis of specific problems in health, physical education or recreation.
Prerequisite(s)/Corequisite(s): Permission of instructor.

HPER 8220 PROBLEMS & ISSUES IN HPER (3 credits)
An examination of current problems and issues in HPER that relate to the general aims and purposes of HPER.

HPER 8300 ANALYSIS OF RESEARCH AND LITERATURE IN HUMAN MOVEMENT (3 credits)
Survey of research and literature in Human Movement for the purpose of orienting the candidate to possible areas of research and developing an understanding of and appreciation for writings in the filed. The course may be offered focusing on only one specific area in HPER.
Prerequisite(s)/Corequisite(s): HPER 8030

HPER 8500 QUALITATIVE RESEARCH METHODS (3 credits)
An examination of qualitative research methods. Emphasis on the broad application of qualitative research in public health, education, and social sciences. Course topics include research design, data collection, data analysis, and reporting.
Prerequisite(s)/Corequisite(s): Not open to non-degree graduate students.

HPER 8850 EXERCISE FOR SPECIAL POPULATIONS (3 credits)
The course will examine the physiological and medical limitations imposed on people with various common chronic diseases/conditions including arthritis, osteoporosis, exercise-induced asthma, obesity, diabetes, hypertension and pregnancy. Special groups such as children and elders will be discussed. Content will emphasize the etiology and guidelines for exercise testing, prescription, and supervision. (Cross-listed with HPER 9851).
Prerequisite(s)/Corequisite(s): PE 4940 or PE 8946

HPER 8900 THESIS (1-6 credits)
The thesis experience is designed to help develop the candidate’s ability to execute accepted procedures associated with the research process appropriate to the Master’s degree.
Prerequisite(s)/Corequisite(s): Permission. Not open to non-degree graduate students.

HPER 9031 RESEARCH IN HEALTH, PHYSICAL EDUCATION AND RECREATION (3 credits)
The course deals with scientific writing, research techniques, statistics, and quantitative research design and technique. Considerable emphasis is placed on evaluation of research in scholarly publications. A research proposal in a form of a master's thesis or doctoral dissertation is written as one of the course requirements. (Cross-listed with HPER 8030).
Prerequisite(s)/Corequisite(s): Graduate standing. Not open to non-degree graduate students.

HPER 9851 EXERCISE FOR SPECIAL POPULATIONS (3 credits)
The course will examine the physiological and medical limitations imposed on people with various common chronic diseases/conditions including arthritis, osteoporosis, exercise-induced asthma, obesity, diabetes, hypertension and pregnancy. Special groups such as children and elders will be discussed. Content will emphasize the etiology and guidelines for exercise testing, prescription, and supervision. (Cross-listed with HPER 8850).
Prerequisite(s)/Corequisite(s): PE 4940 or PE 8946.

PE 8040 ADVANCED STATISTICS (3 credits)
This course will be a study in the statistical methods commonly used in descriptive and experimental research in physical education and exercise science. Application, particularly regarding the purpose, selection, and interpretation of statistical procedures will be emphasized. (Cross-listed with PE 9041)
Prerequisite(s)/Corequisite(s): HPER8030

PE 8076 OPTIMIZING SPORTS PERFORMANCE (3 credits)
The course is designed for coaches, athletes and physically active people, and allied health professionals. Course content emphasizes integration of several disciplines in sports medicine aimed at preparing one for optimal sports performance. Topics include peaking, detraining, overuse injury, efficiency, special foods and nutritional requirements, genetics and trainability, and designing of multi-year training schedules. (Cross-listed with PE 4070)
Prerequisite(s)/Corequisite(s): PE 4630 with a grade of C- or better or BMCH 4630 with a grade of C- or better and PE 4940 with a grade of C- or better.
PE 8086 CLINICAL EXERCISE PHYSIOLOGY (3 credits)
This course will offer students the knowledge, skills, and abilities to take the American College of Sports Medicine’s health fitness instructor certification exam. This course will emphasize health risk assessment, exercise testing, and exercise prescription for healthy and clinical populations. (Cross-listed with PE 4080)
Prerequisite(s)/Corequisite(s): PE 2210 with a grade of C- or better, PE 2500 with a grade of C- or better or BMCH 2500 with a grade of C- or better or BIOL 2840 with a grade of C- or better and PE 4940 with a grade of C- or better.

PE 8120 CURRENT TOPICS IN WEIGHT MANAGEMENT (3 credits)
This course will focus on current issues related to weight management. Candidates will review the guidelines for physical activity and nutrition, apply them to current reading material sold in book stores, and develop a best practice for weight management using what they have learned.
Prerequisite(s)/Corequisite(s): Not open to non-degree graduate students.

PE 8130 IMPLEMENTING PHYSICAL ACTIVITY IN DIVERSE POPULATIONS (3 credits)
This course will focus on information necessary to assess, design, implement, and evaluate the need for and effectiveness of physical activity interventions in diverse populations, races, and ethnicities. These populations will include: African American, Native American, Hispanic, Asian American, Pacific Islanders, and Caucasian. Additionally, candidates will complete a health and physical activity service learning project in which they will work with diverse populations in the community. (Cross-listed with PE 9131)
Prerequisite(s)/Corequisite(s): PE 3900 or PE 8905 or PE 8700 or HED 8600. Not open to non-degree graduate students.

PE 8140 PHYSICAL ACTIVITY ASSESSMENT AND HEALTH RELATED RESEARCH (3 credits)
This course will cover the broad scope of research on physical activity and public health. Emphasis will be placed on the application of physical activity assessment techniques. (Cross-listed with PE 9141)

PE 8176 MOTOR ASSESSMENT & PRESCRIPTION (3 credits)
An in-depth survey of motor and fitness assessment instruments for use with pre-school, elementary, and secondary school students. The use of test scores for diagnosis and prescription of physical education activities for special populations will be addressed. This course will enhance the skills of the teacher to orchestrate the learning environment for students with special needs. (Cross-listed with PE 4170)
Prerequisite(s)/Corequisite(s): PE 4150

PE 8186 PRACTICE FOR DISABLED CHILD (3 credits)
This course is designed as a practicum with theoretical and practical experience in addressing the motor needs of young disabled children in a physical education setting. This course will enhance the skills of the teacher to orchestrate the learning environment for students with special needs.
Prerequisite(s)/Corequisite(s): PE 4170 or PE 8176

PE 8206 PLANNING WORKSITE WELLNESS PROGRAM (3 credits)
This course will focus on the planning of quality worksite wellness programs utilizing standards established by the Association for Worksite Health Promotion. Steps in the planning process such as needs assessment, strategic planning, implementation, and evaluation will be taught with special application to the worksite. Critical issues involving worksite programs also will be addressed such as upper management support, program standards, corporate culture, competencies for worksite health promotion professionals, economic benefits, behavioral theories, legal issues, and the integration of worksite wellness programs and health care. (Cross-listed with PE 4200)
Prerequisite(s)/Corequisite(s): Junior standing.

PE 8210 EMERGENCY MANAGEMENT OF INJURY AND ILLNESS (2 credits)
The purpose of this course is to prepare students to respond to emergent conditions that affect patients involved in physical activity. Students will learn to recognize the signs and symptoms of acute injury and illness, assess patients using evidence-based methods, apply appropriate treatments, make appropriate referral decisions, and implement effective prevention strategies to reduce the risk of injury and illness.
Prerequisite(s)/Corequisite(s): Admission to the Master of Arts in Athletic Training program. Not open to non-degree graduate students.

PE 8240 SPORT IN AMERICAN CULTURE (3 credits)
Sport in American culture is a study of sport from a theoretical perspective. The relationship between sport and sub-cultures (to include disadvantaged American cultures), economics, global influences, and technology will be analyzed.

PE 8266 INCL INDV W/DISABILITIES IN PE (3 credits)
This course is for physical education, health education, special education and therapeutic recreation candidates interested in the inclusion of children with disabilities in physical education environments. (Cross-listed with PE 4260)
Prerequisite(s)/Corequisite(s): PE 3060 or PE 4000 and PE 4150

PE 8280 CURRICULUM IN PE (3 credits)
A study of the foundations for curriculum development. Special consideration is given to curriculum change, curriculum patterns and programs in physical education which will meet a culturally diverse, global society.

PE 8310 ATHLETIC TRAINING TECHNIQUES (2 credits)
Overview course including basic components of the athletic training profession including the prevention, recognition, evaluation and immediate care of athletic injuries. Medical terminology, tissue healing, taping procedures, and professional considerations will be covered.
Prerequisite(s)/Corequisite(s): Admission to the Master of Arts in Athletic Training. Not open to non-degree graduate students.

PE 8316 LOWER EXTREMITY EVALUATION (3 credits)
This course is designed to provide the candidate with knowledge and skill in the area of advanced athletic injury assessment. The candidate will be exposed to current methodology in the field of orthopedic assessment, pathophysiology of orthopedic injury, and application of current research in injury evaluation. The candidate will receive practical experience in the management of athletic injuries. This course will focus on the low back, hip, and lower extremities. (Cross-listed with PE 4310)
Prerequisite(s)/Corequisite(s): PE 8326 and 8710. Not open to non-degree graduate students.

PE 8326 UPPER EXTREMITY EVALUATION (3 credits)
This course is designed to provide the candidate with knowledge and skill in the area of advanced athletic injury assessment. The candidate will be exposed to current methodology in the field of orthopedic assessment, pathophysiology of orthopedic injury, and application of current research in injury evaluation. The candidate will receive practical experience in the management of athletic injuries. This course will focus on the head, neck, thorax, and upper extremities. (Cross-listed with PE 4320)
Prerequisite(s)/Corequisite(s): PE 8316, PE 8336, and PE 8720. Not open to non-degree graduate students.

PE 8336 ATHLETIC THERAPEUTIC MODALITIES (3 credits)
This course will cover the theory, physiology and application of physical agents used in the treatment of injuries and illness. Students will gain practical experience utilizing selected agents to treat injuries and illnesses. (Cross-listed with PE 4330)
Prerequisite(s)/Corequisite(s): PE 8326 and PE 8710. Not open to non-degree graduate students.
PE 8346 REHAB TECH IN ATH TRAINING (3 credits)
The use of basic theories and principles of athletic injury rehabilitation including therapeutic exercise and the use of physical agents. The development of rehabilitation programs including hands-on practical application. (Cross-listed with PE 4340).
Prerequisite(s)/Corequisite(s): Written Permission Required

PE 8356 ORGANIZATION AND ADMINISTRATION OF ATHLETIC TRAINING (3 credits)
Administration of athletic training programs including the use of records and forms, budgets, facility design and legal concerns. (Cross-listed with PE 4350)
Prerequisite(s)/Corequisite(s): PE 3430, PE 4320.

PE 8360 ADV ORTHO & MED ASPECTS (3 credits)
This course will enhance the candidate's knowledge of orthopedic aspects and general medical conditions of the athlete. Involves lecture, directed observation, experiential learning, literature review and hands-on experience. Local medical professionals will be providing instruction and supervision within their specialties. The candidate will be exposed to advanced evaluation and treatment skills, including imaging techniques, surgical procedures, rehabilitation and athletic training management.
Prerequisite(s)/Corequisite(s): PE 8316 and PE 8326

PE 8370 ANALYZING PE TCH & SPORT INST (3 credits)
This course will examine the teaching and coaching in physical education and sport. It will identify assessment techniques utilized in teaching and coaching behavior research as well as typical prescriptions in an effort to improve one's performance.

PE 8460 OCCUPATIONAL BIOMECHANICS (3 credits)
The course will address the biomechanical basis of human performance in work places and provide candidates with information in the application of biomechanics, engineering for designing industrial tools, equipment, products, and jobs that take into consideration human physical capabilities and limitations.
Prerequisite(s)/Corequisite(s): PE 4630 or equivalent and PE 2880. Not open to non-degree students.

PE 8506 BEHAVIORAL ASPECTS OF COACHING (3 credits)
This course is designed to provide the physical education teacher and athletic coach with an overview of the behavioral aspects of coaching athletes. The course will provide information which will enable the coach to enhance as well as orchestrate performance of elementary, junior high, senior high, college, and post-college athletes. (Cross-listed with PE 4500)

PE 8700 PSYCHOLOGY OF PHYSICAL ACTIVITY (3 credits)
The central purpose of this course is to examine the psychological antecedents and consequences of exercise and physical activity behaviors. The course will focus on traditional theories/principles of psychology as they relate to various physical activity settings. (Cross-listed with PE 9701)
Prerequisite(s)/Corequisite(s): Undergraduate or graduate course in either: Motivation for Physical Activity (PE 3900), or equivalent; Behavioral Aspects of Coaching (PE 4500/8506), or equivalent; or instructor permission.

PE 8710 CLINICAL PRACTICUM IN ATHLETIC TRAINING I (1 credit)
Clinical Practicum in Athletic Training I is the first course in the Clinical Practica series for students admitted to the Master of Arts in Athletic Training Program. Students will perform required clinical experiences under the supervision of a licensed athletic trainer in order to improve clinical and decision-making skills.
Prerequisite(s)/Corequisite(s): Admission to the MA in Athletic Training program, instructor permission, & continued compliance with published Athletic Training Program Technical Standards for Admission. Co-requisite with enrollment in PE 8326. Not open to non-degree graduate students.

PE 8720 CLINICAL PRACTICUM IN ATHLETIC TRAINING II (1 credit)
Clinical Practicum in Athletic Training II is the second course in the Clinical Practica series for students admitted to the Master of Arts in Athletic Training Program. Students will perform required clinical experiences under the supervision of a licensed athletic trainer in order to improve clinical and decision-making skills.
Prerequisite(s)/Corequisite(s): Admitted to MA in Athletic Training program, PE 8710 Clinical Practicum AT I, instructor permission, & continued compliance w/published Athletic Training Program Technical Standards for Admission. Co-reqs: PE 8316 & 8336. Not open to non-degree grads.

PE 8730 CLINICAL PRACTICUM IN ATHLETIC TRAINING III (1 credit)
Clinical Practicum in Athletic Training III is the third course in the Clinical Practica series for students admitted to the Master of Arts in Athletic Training Program. Students will perform required clinical experiences under the supervision of a licensed athletic trainer in order to improve clinical and decision-making skills.
Prerequisite(s)/Corequisite(s): Admitted to MA in Athletic Training program, PE 8720 Clinical Practicum AT II, instructor permission, & continued compliance w/published Athletic Training Program Technical Standards for Admission. Co-reqs: PE 8346 & 8356. Not open to non-degree grads.

PE 8740 CLINICAL PRACTICUM IN ATHLETIC TRAINING IV (1 credit)
Clinical Practicum in Athletic Training IV is the fourth course in the Clinical Practica series for students admitted to the Master of Arts in Athletic Training Program. Students will perform required clinical experiences under the supervision of a licensed athletic trainer in order to improve clinical and decision-making skills.
Prerequisite(s)/Corequisite(s): Admission to the MA in Athletic Training program, PE 8730 Clinical Practica in Athletic Training III, instructor permission, and continued compliance with published Athletic Training Program Technical Standards for Admission. Co-req: PE 8966.

PE 8800 RISK MGT HLTH/FIT PROFESSIONS (3 credits)
A study of risk management for health fitness professionals with a focus on minimizing liability exposures for health fitness facilities and their personnel. Principles of risk management such as the assessment of liability exposures, the development and implementation of risk management strategies, and the evaluation of these strategies will be explored as well as the law as it pertains to health fitness liability. Candidates will develop the knowledge and skill to manage high quality health fitness programs in various settings.
Prerequisite(s)/Corequisite(s): PE 4010 or PE 8016

PE 8856 CARDIOVASCULAR DISEASE PREVENTION & REHABILITATION (3 credits)
The purpose of this course is to provide candidates with an introduction to the theories and practices involved in all phases of cardiac rehabilitation. (Cross-listed with PE 4850)
Prerequisite(s)/Corequisite(s): PE 8946

PE 8865 SCIENTIFIC ASPECTS STRENGTH DEV (3 credits)
This course is designed to explore the nature of muscular strength development, to investigate the physiological basis of physical conditioning, and to provide teachers, coaches and trainers with practical experience in designing specialized conditioning programs for a variety of sports and cultures. (Cross-listed with PE 3860)

PE 8900 MGMT & LEAD SKILLS FOR FIT MGRS (3 credits)
This course is a study of management and leadership skills necessary for the successful management of fitness and wellness facilities and programs. Candidates will develop knowledge and practical skills in the areas of personnel and financial management, marketing, and operating policies and procedures as well as develop a personal leadership philosophy based on sound principles of leaders.
Prerequisite(s)/Corequisite(s): PE 8016 or ACSM Health Fitness Certification.
**PE 8910 INTERNSHIP IN EXERCISE SCIENCE (3 credits)**
This course is an off-campus, supervised, educational work experience of at least 150 clock hours at an approved worksite offering programs and experiences in fitness development or health promotion. Candidates must have current CPR certification.

**Prerequisite(s)/Corequisite(s):** The prerequisites for this course include 90 hours completed, 2.5 GPA, PE 4900 and permission of instructor.

**PE 8950 ADVANCED EXERCISE PHYSIOLOGY (3 credits)**
A detailed analysis of selected topics including acute and chronic effects of exercise on metabolic, pulmonary, and cardiovascular function; and sports nutrition. Current research findings and methodology will be emphasized. (Cross-listed with PE 9951)

**Prerequisite(s)/Corequisite(s):** PE 4940 or equivalent

**PE 8966 TOPICS IN SPORTS MEDICINE (3 credits)**
This course covers selected topics regarding the science and medicine of sports participation. Some areas to be covered include the medical supervision of the athlete, special populations, conditioning, environmental concerns and sports nutrition. (Cross-listed with PE 9866)

**Prerequisite(s)/Corequisite(s):** PE 8346, PE 8356, and PE 8730, or Instructor consent.

**PE 9040 PHYSICAL ACTIVITY EPIDemiology (3 credits)**
This course will cover the broad scope of the issues related to epidemiological methods that are relevant to the study of physical activity populations. It is intended to enhance students’ ability to understand and apply epidemiological methods to physical activity related research.

**Prerequisite(s)/Corequisite(s):** PE 8130 Implementing Physical Activity I and PE 8040 Advanced Statistics in PE or related course or permission by the instructor; not open to non-degree graduate students

**PE 9041 ADVANCED STATISTICS (3 credits)**
This course will be a study in the statistical methods commonly used in descriptive and experimental research in physical education and exercise science. Application, particularly regarding the purpose, selection, and interpretation of statistical procedures will be emphasized. (Cross-listed with PE 9041)

**Prerequisite(s)/Corequisite(s):** HPER 9031 or equivalent.

**PE 9131 IMPLEMENTING PHYSICAL ACTIVITY IN DIVERSE POPULATIONS (3 credits)**
This course will focus on information necessary to assess, design, implement, and evaluate the need for and effectiveness of physical activity interventions in diverse populations, races, and ethnicities. These populations will include: African American, Native American, Hispanic, Asian American, Pacific Islanders, and Caucasian. Additionally, candidates will complete a health and physical activity service learning project in which they will work with diverse populations in the community. (Cross-listed with PE 8130)

**Prerequisite(s)/Corequisite(s):** PE 3900 or PE 8905 or PE 8700 or HED 8600. Not open to non-degree graduate students.

**PE 9141 PHYSICAL ACTIVITY ASSESSMENT AND HEALTH RELATED RESEARCH (3 credits)**
This course will cover the broad scope of research on physical activity and public health. Emphasis will be placed on the application of physical activity assessment techniques. (Cross-listed with PE 8140)

**PE 9701 PSYCHOLOGY OF PHYSICAL ACTIVITY (3 credits)**
The central purpose of this course is to examine the psychological antecedents and consequences of exercise and physical activity behaviors. The course will focus on traditional theories/principles of psychology as they relate to various physical activity settings. (Cross-listed with PE 8140)

**Prerequisite(s)/Corequisite(s):** Undergraduate or graduate course in either: Motivation for Physical Activity (PE 3900), or equivalent; Behavioral Aspects of Coaching (PE 4500/8506), or equivalent; or instructor permission.

**PE 9810 HIGHER EDUCATION TEACHING SEMINAR (3 credits)**
The seminar is designed to prepare students for entry into a higher education teaching career. This seminar requires doctoral students to teach an undergraduate or graduate lecture course relevant to their field of preparation. The seminar includes an examination of the roles, responsibilities, and privileges associated with teaching in higher education.

**Prerequisite(s)/Corequisite(s):** Admittance to the UNO Doctoral Program in Exercise Science and successful completion of 24 hours of doctoral coursework and approval from advisor. Not open to non-degree students.

**PE 9820 SERVICE EXPERIENCE IN HIGHER EDUCATION (3 credits)**
This seminar will allow students the opportunity to gain valuable knowledge of the service expectations of faculty in higher education settings. The seminar will focus on service opportunities within the university, within the profession and within the community. Participants in the seminar will complete appropriate service activities.

**Prerequisite(s)/Corequisite(s):** Admittance to the UNO Doctoral program in Exercise Science, successful completion of 24 hours of doctoral coursework, and approval from advisor. Not open to non-degree students.

**PE 9910 DOCTORAL SEMINAR (3 credits)**
The major goal of this course is to teach the graduate student how to write manuscripts/grants and be an effective academician with strong ethics. The outcome of this course is for the student to produce a manuscript based on data acquired in the laboratory from the ideas developed in the seminar or submit a grant that will support the research ideas developed in at least one semester. The material covered is intended to equip students with the skills necessary to be successful in their academic careers with emphasis given on writing scientific papers. (Cross-listed with BMCH 9910)

**Prerequisite(s)/Corequisite(s):** Admission into the PhD program. Not open to non-degree graduate students.

**PE 9951 ADVANCED EXERCISE PHYSIOLOGY (3 credits)**
A detailed analysis of selected topics including acute and chronic effects of exercise on metabolic, pulmonary, cardiovascular function, skeletal muscle function, and sports nutrition. Current research findings and methodology will be emphasized. (Cross-listed with PE 8950)

**Prerequisite(s)/Corequisite(s):** PE 4940 or equivalent.

**PE 9960 ADVANCED EXERCISE PHYSIOLOGY II (3 credits)**
The focus of this course is a detailed analysis of the mechanisms responsible for acute and chronic responses to exercise at the cellular and molecular level. Current and historical research will be emphasized.

**Prerequisite(s)/Corequisite(s):** PE 8950/9951. Not open to non-degree graduate students.

**PE 9990 DISSERTATION (1-15 credits)**
The course provides doctoral candidates in Exercise Science with a process to complete a dissertation research plan. The course learning activities will focus on the completion of a candidate’s dissertation. The course is designed to allow advanced doctoral candidates to demonstrate technical mastery of the discipline and to advance knowledge by completing an investigation. (Cross-listed with BMCH 9990)

**Prerequisite(s)/Corequisite(s):** Admittance to the UNO Doctoral Program in Exercise Science, successful completion of doctoral coursework & comprehensive exams, approval of the dissertation supervisory committee chair & advancement to candidacy. Not open to non-degree graduate students.