# Graduate Program Policy Statement

**for the**

**Master of Science in Exercise Science**

**Approved by Faculty Senate May 9, 2011**

*Revised 11.01.17 (caknight@udel.edu)*

# Part I. Program History

## Purpose

The Master of Science in Exercise Science was created to provide a concentrated program of academic study for students interested in developing a deeper understanding of theory and applications related to the functioning of the human body during physical activity.

The MS program in Exercise Science is supported with well-equipped research facilities, including three-dimensional video capabilities, electromyography, and force platforms, as well as equipment for measurement of cardiovascular and cardiopulmonary function, bone mineral density, body composition, functional muscular capacity, blood lactate, and motor unit discharge. Graduate students in this program are expected to participate in ongoing faculty-directed research programs.

## Evolution of the Program

The Master of Science in Exercise Science degree program was initiated as a Master of Science Degree in Physical Education in March 1972 on an experimental basis, with the mission of providing concentrated academic opportunities for those students interested in developing a deeper understanding of theory and applications related to the functioning of the human body during physical activity. The University Graduate Committee approved the experimental program for a period of three years, and the program received permanent status in November 1975.

In May 1988, the graduate program was evaluated by a panel of educators from other universities with established and reputable programs of graduate study in physical education. The evaluating team made a number of recommendations regarding course offerings, faculty assignments, admission practices, research and facilities[[1]](#footnote-1). All of the recommendations have been addressed.

In 1998, a University-wide reorganization of academic units resulted in the merging of the College of Physical Education, Athletics, and Recreation with the College of Nursing and the Department of Nutrition. The new college was named the College of Health and Nursing Sciences, and the Department of Physical Education was renamed the Department of Health and Exercise Sciences. The Master’s degree program offered through the Department of Health and Exercise Sciences and formerly known as the Master’s in Physical Education degree program, was changed to the M.S. with a major in Exercise Science in 1999. In 2003 the departments of Health and Exercise Science and Nutrition and Dietetics merged to form the Department of Health, Nutrition, and Exercise Sciences and in 2005 the College was renamed the College of Health Sciences.

In 2010, the Department of Health, Nutrition and Exercise Sciences was divided into the Department of Behavioral Health and Nutrition (BHAN) and the Department of Kinesiology and Applied Physiology (KAAP). Undergraduate and graduate degree programs in Exercise Science and the doctoral program in Applied Physiology are housed within KAAP.

## Degrees Offered

The graduate program in Exercise Science offers a Master of Science degree in Exercise Science with the following five areas of concentration.

* **Biomechanics** is an interdisciplinary science that objectively interprets movement in living organisms. Emphasis is placed on techniques of measuring kinematic and kinetic characteristics of living organisms and on mathematical methods of analysis, with application in sports and rehabilitation.
* **Exercise Physiology** is a science that studies the effect of physical activity on the systems of the human body, with applications in physiological assessment, cardiac rehabilitation, and exercise prescription.
* **Motor Control** focuses on the development, acquisition and control of underlying processes responsible for movement. Emphasis may be placed on issues of motor behavior, development, learning and/or neuromuscular mechanisms.
* **Sports Medicine** is focused on injury mechanisms, prevention and rehabilitation strategies in athletes for accelerated return to competition as well as applications of what is learned from competitive athletes to improving the health of all physically active individuals.
* **Clinical Exercise Physiology** provides students with the opportunity to develop an in depth knowledge of and hands-on experiences in preventive and rehabilitative practices for patients with cardiopulmonary, metabolic, and musculoskeletal diseases as well as apparently healthy and low risk populations. The Clinical Exercise Physiologist Specialization is designed to be a 12 month, non-thesis program.

# Part II. Admission

Admission to the graduate program is competitive. Those who meet stated minimum requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer other appropriate strengths.

## Admission Requirements

The Exercise Science Graduate Program Committee makes admission decisions. Students will be admitted to the program based upon enrollment availability and their ability to meet the following recommended entrance requirements.

1. Baccalaureate degree from an accredited college or university
2. Acceptable undergraduate transcripts including an undergraduate GPA of 3.0 or higher
3. The equivalent of an undergraduate major in kinesiology, exercise science or related discipline
4. On the 130-170 scale, GRE scores are generally above 151 for Quantitative Reasoning and above 150 for Verbal Reasoning.
5. Three letters of recommendation indicating the capability, interest, maturity, and scholarly potential of the candidate for graduate study
6. Acceptance by a primary advisor

Recommended prerequisites for Biomechanics include:

* Math through calculus
* Anatomy
* One year of physics
* Computer programming experience

Recommended prerequisites for Exercise Physiology and Clinical Exercise Physiology include:

* One year of biology
* Two years of chemistry
* One year of physics

Recommended prerequisites for Motor Control and Sports Medicine include:

* Math through calculus
* Anatomy and physiology
* One year of biological or physical science

Admission is selective and competitive, based on the number of well-qualified applicants and the limits of available faculty and facilities. Those who meet stated minimum academic requirements are not guaranteed admission, nor are those who fail to meet those requirements necessarily precluded from admission, if they offer other appropriate strengths. See the [Admission Information](http://catalog.udel.edu/content.php?catoid=12&navoid=476) section in the Graduate Catalog for additional information.

## University Admission Procedures

Applicants must submit all materials directly to the University Office of Graduate and Professional Education using the online admission process before admission can be considered. Admission applications are available at:
<https://grad-admissions.udel.edu/apply/>

1. ***Application Deadlines***

Applications are processed as they are submitted. However, students wishing to be considered for graduate funding must complete the application process no later than January 15 of the preceding year. The Graduate Program Committee typically requires a period of one month to process completed applications.

## Admission Application Processing

The admission process is completed as follows: First, completed applications are reviewed by the Exercise Science Graduate Program Committee. If the student is admissible, the application is circulated to all appropriate Exercise Science faculty in an effort to match the student with a faculty advisor. Faculty members tend to advise students whose background, goals, and objectives are compatible with their own areas of research and funding. Admissible applicants are formally admitted into the program once a faculty member has agreed to accept the applicant as an advisee.

## Admission Status

Students admitted into the Exercise Science graduate program may be admitted into one of three categories.

1. **Regular.** Regular status is offered to applicants who meet all of the established entrance requirements, who have a record of high scholarship in their fields of specialization, and who have the ability, interest, and maturity necessary for successful study at the graduate level in a degree program.

Applicants who file an application during the final year of undergraduate or current graduate work and are unable to submit complete official transcripts showing the conferral of the degree will be admitted pending conferral of the degree if records are otherwise satisfactory and complete. Failure to provide official test scores and documents showing degree conferral by the first day of classes may result in revocation of admission to the graduate program.

1. **Provisional.** Provisional status is offered to applicants who are seeking admission to a degree program but lack specific prerequisites needed in the University of Delaware degree requirements. All provisional requirements must be met within the deadline given before regular status can be granted. Failure to meet the provisions by this deadline is grounds for dismissal from the program. Students admitted with provisional status to a degree program are generally not eligible for assistantships nor fellowships.
2. **Non-Degree Status.** Applicants who wish to earn graduate credit but do not intend to earn a graduate degree at the University of Delaware may be admitted with non-degree graduate status. Admission with non-degree status implies no commitment by the University or the graduate program about later admission as a regular student. Such applicants must submit official college transcripts. International applicants must submit official proof of English proficiency such as TOEFL or IELTS scores.

Non-degree students are not required to follow course sequences, but they are held to the same academic standards as are other graduate students. This status is valid for a stated limited time. The student must complete an admission application to be considered for changing to regular status. Earned graduate credit may or may not be accepted if the student’s classification is changed to regular status. In general, graduate credit must fit into an approved program of study and all credits must have been completed within the appropriate time limit.

Non-degree students taking classes under cooperative agreements must submit a letter from their home institution, typically from their graduate dean or registrar, certifying that they are graduate students in good standing at another institution. Such letters will be accepted in lieu of the transcripts that are required of other non-degree applicants.

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# Part III. Academic

## Course Requirements

The Master of Science with a major in Exercise Science has five concentrations. The concentrations in **Biomechanics**, **Exercise Physiology**, **Motor Control** and **Sports Medicine** require 24 credits of coursework at the 600 or 800 level, and 6 credits of thesis\*. The 24 credits of coursework are specified in the individual planned programs of study, and must include 15-18 credits of coursework in courses within Exercise Science, and 6-9 credits of coursework in cognate areas as specified by the requirements for each concentration. A total of 30 credits is required to complete the degree. The concentration in **Clinical Exercise Physiology** requires 24 credits of coursework at the 600 or 800 levels, and 9 credits of practicum.

 \* In special situations, a non-thesis option is available, in which case the student will replace the 6 credits of thesis with

1. 3 credits of research credit and 3 credits of additional coursework OR
2. 6 credits of research credit

Coursework for each concentration is specified in the Appendix and must include 18-21 credits of coursework in courses within Exercise Science, and 6-12 credits of coursework in cognate areas as specified by the requirements for each concentration.

Individual programs of study are developed in consultation with the student’s advisor.

**Maximum independent study credits:** Students in the Master’s degree program are allowed to take a maximum of six credits of independent study. Additional independent study credits will not count towards graduation.

**Maximum transfer credits:** A maximum of 9 graduate credit hours may be transferred from another institution to the degree.

**Candidates for the degree must have regular status.**

## Revisions to Planned Program of Study

Students who wish to make changes to their program of study must first obtain permission from their advisor. The advisor must then make a written request to the Graduate Program Committee to revise the program of study.

## Regulations Governing Theses

Students are responsible for adhering to all university policies and deadlines related to submission of forms and final thesis documents. Deadlines and policies can be found at the website for the Office of Graduate and Professional Education. Follow the [GRADUATION: Step-by-Step](http://grad.udel.edu/policies/step-by-step-guide-to-graduation/) guide to adhere to the University policies for graduation.

The following policies are specific to the Department of Kinesiology and Applied Physiology

1. *Establishment of Thesis Committee*: The student and his/her advisor will create a thesis committee at the time the student begins to develop the thesis proposal. The thesis committee shall consist of at least two University faculty from within the Department of Kinesiology and Applied Physiology, and at least one additional faculty member from inside or outside of the Department. The definition of University faculty shall include professional staff members who hold secondary faculty appointments within the department. Faculty who have retired or resigned from the University may continue to chair committees of students whose work began under their direction prior to their retirement or departure from the University. Individuals who do not meet the above stated definition given for faculty status may co-chair the thesis committee provided that the other co-chair meets the definition for faculty status. Outside faculty shall include individuals not affiliated with the M.S. in Exercise Science program. These may be individuals from outside of the University who are nationally recognized for their expertise in the area of study specified by the thesis. The Graduate Program Committee must approve committee members from outside of the University. It is the responsibility of the thesis advisor to replace members who withdraw from the committee during the thesis process.
2. *Defense of the Thesis Proposal*: The format of the thesis must adhere to the [UD Thesis / Dissertation Manual](http://www.udel.edu/gradoffice/forms/thesismanual.pdf). A copy of the thesis proposal must be delivered to each facility that houses Department faculty at least one week prior to the proposal defense. A copy of the thesis proposal must be delivered to the members of the thesis committee at least one week in advance of the proposal defense. Proposals that involve the use of human subjects must receive approval from the University Institutional Review Board (IRB). Details for creating consent forms and submitting studies for review by the IRB can be obtained from the [UD Research Office](http://www1.udel.edu/research/).

All Department faculty and students will be invited to the thesis proposal defense. The candidate will present a summary of the proposed research, and will then address questions from the committee, attending faculty, and invited guests. After all questions have been addressed, the thesis committee will meet privately to decide whether the proposal is accepted, rejected, or accepted with stipulations. Details of the meeting will then be presented to the student. A majority of committee votes will decide the outcome. In the event of a split vote, the decision to accept or reject the thesis proposal will rest with the thesis advisor.

Thesis committee members should sign the final copy of the approved proposal. A signed copy of the approved thesis proposal should be forwarded to the Exercise Science Graduate Coordinator. Students who fail the thesis proposal defense will receive one additional opportunity to repeat the process and defend a new or modified thesis proposal.
3. *Defense of the Thesis*: The format of the thesis must adhere to the [UD Thesis / Dissertation Manual](http://www.udel.edu/gradoffice/forms/thesismanual.pdf). A copy of the thesis proposal must be delivered to each facility that houses Department faculty at least one week prior to the proposal defense. A copy of the thesis proposal must be delivered to the members of the thesis committee at least one week in advance of the proposal defense. Thesis content and organization should be appropriate for the journal(s) in which the thesis is targeted for publication with additional literature review materials contained in an appendix.

All Department faculty and graduate students will be invited to the thesis defense. The candidate will present a summary of the completed research, and will then address questions from the committee, attending faculty, and invited guests. After all questions have been addressed, the thesis committee will meet privately to decide whether the thesis is accepted, rejected, or accepted pending revisions. Details of the meeting will then be presented to the student. A majority of committee votes will decide the outcome. In the event of a split vote, the decision to accept or reject the thesis will rest with the thesis advisor. Students must pass the thesis defense in no more than two attempts in order to complete the requirements for the Master of Science degree with a major in Exercise Science.

## Non-Thesis Requirements

 Students electing the non-thesis option will complete the degree requirements in one of two ways:

1. 6 credits of KAAP868: Research OR
2. 3 credits of KAAP868: Research AND 3 credits of Cognate Area coursework.

In the KAAP 868 course, the student will work individually with their faculty mentor to complete a supervised research experience.

**University Policy:** Once a master’s student pursuing a non-thesis option has registered for all required course credits needed for the degree, but has not completed other non-thesis degree option requirements such as a portfolio, research option paper, comprehensive examination, art show or exhibit, or incomplete grades, the student is required to maintain his/her eligibility for the degree program during the fall and spring semesters by registering for Master’s Sustaining: Non-thesis (UNIV 895). All students, including sustaining students, must be registered in the semester in which the degree is officially awarded. Sustaining registration is required for summer and winter session only if the degree is awarded at the conclusion of the summer or winter session. Students in sustaining status are considered full-time.

# Part IV. Financial Aid

## University Guidelines for Graduate Students on Fellowship or Assistantship Contracts

Students who are awarded a fellowship or an assistantship for the fall and/or spring semester assume a contract with the University and are expected to give their full-time attention to graduate study in those semesters. Students are classified as “on contract” if paid at least 50% of the U.D. minimum stipend in the fall and/or spring semester and are matriculated as a full-time student. Students who receive no stipend but receive a departmental tuition scholarship of at least 50% in the fall and/or spring semester and are matriculated as full-time students are also classified as “on contract.” Students who are classified as research assistants and are paid at least 100% of the minimum stipend in the months of June and July and/or August are classified as “on contract” in the summer months. See the [Guidelines for Graduate Students on Fellowship or Assistantship Contracts](http://grad.udel.edu/policies/#fellowship-assistantship) for additional policy details.

1. ***Graduate Assistantships in Department of Kinesiology and Applied Physiology***

Eligibility for initial employment as a Graduate Assistant in the Department of Kinesiology and Applied Physiology requires the following:

1. Regular admission into the master's program in Exercise Science, and
2. Ability to teach or otherwise provide assistance in an area of program need.

The Graduate Program Committee shall make recommendations to the Department Chair, who shall make the final determination of employment.

The term of employment shall normally be two years. However, continuing employment during that two year period shall be contingent upon the following:

1. Satisfactory teaching performance, as determined by the Department Chair following consultation with the Activity Program Director and/or the supervising faculty.
2. Maintenance of at least a 3.0 GPA over all courses taken, and
3. Satisfactory progress toward the master's degree in Exercise Science.

## Workload Assignment

The Department Chair shall make assignment of Graduate Assistant duties on a semester-by- semester basis. Duties assigned shall represent a time-wise commitment by the Graduate Assistant of no more than 20 hours per week. Responsibilities may include teaching lecture classes and/or teaching laboratory classes in undergraduate programs within the Department of Kinesiology and Applied Physiology. Other ongoing and incidental duties may also be assigned. Specific responsibilities for Graduate Assistants teaching activity, lecture, and laboratory classes are listed below.

Weekly Responsibilities for Graduate Assistants Assigned to a Lecture Class

|  |  |
| --- | --- |
| Preparation: Read and know background content materials. Formulate lesson plans. | 2-3 hours |
| **Contact time:**Deliver lecture to classFacilitate class discussion and problem solvingOrganize and supervise student activitiesAnswer student questionsAnticipate and address student learning needs | 2-3 hours |
| **Grading:** Quizzes, exams and assignments.  | 4 hours |
| **TOTAL** | 8-10 Hours / week |

Weekly Responsibilities for Graduate Assistants Assigned to a Laboratory Class

|  |  |
| --- | --- |
| **Preparation:**Read and know background content materialsMeet with faculty instructor to review previous week's lab session and discuss plans for the current week's laboratory experiencesPlan organizational format for laboratory sessionSet up needed equipment and properly store equipment at end of class | 1.5 hours |
| **Contact time:** Return graded lab reports or quizzes Deliver introductory lecture to class Organize and supervise student activities Answer student questions and troubleshoot Provide a wrap-up session at the end | 2.0 hours |
| **Grading:**Lab reports and quizzes | 4.0 hours |
| **First time:** also attend lectures | 2.0 hours |
| **TOTAL** | 7.5-9.5 hours / week |

\* In the case of an assignment involving multiple sections of the same class, 2.0 total hours of preparation time per week shall be considered sufficient for all sections.

## Other Responsibilities

Graduate Assistants shall also be expected to perform other duties at the request of the Department Chair or Activity Program Director, which may include, but are not limited to the following:

* 1. Cover classes for absent instructors,
	2. Assist with special events in which the program is participating, and
	3. Assist the Activity Program Director or supervising faculty for a laboratory class or with other activities as needed.
	4. Work under the supervision of a faculty member in a department research laboratory by mutual agreement of the Department Chair and the supervising faculty member.

# VI. Departmental Operations

## Administration and Faculty

The Exercise Science Graduate Program Committee administers the graduate program in Exercise Science. The Committee is composed of Exercise Science faculty members from the Department of Kinesiology and Applied Physiology. The Department Curriculum Committee provides oversight of all programs and curricula in the department.

Faculty members who teach graduate courses and advise graduate students in Exercise Science must have a doctorate or equivalent. In some instances, faculty members with a master's degree and special expertise in an area of Exercise Science as a result of concentrated study, employment experience, or service may be recommended for graduate teaching. In such cases, the faculty member must have a record of successful teaching in a specialized area of Exercise Science, proven scholarly ability, and the endorsement of the Chair of the Department of Kinesiology and Applied Physiology.

# APPENDIX A

**Concentration Areas**

## Master of Science in Exercise Science Concentration: Exercise Physiology

Exercise Physiology is a science that studies the effect of physical activity on the systems of the human body. Opportunities are available in scientific research, physiological assessment, cardiac rehabilitation, and exercise prescription. Students in the MS program in exercise physiology are required to conduct research and complete a thesis or faculty approved research project.

|  |  |
| --- | --- |
| Credit Requirements:Credits within Exercise Science | 15-18 |
| Cognate areas outside Exercise Science | 6-9 |
| Research or ThesisTotal number of required credits  | 3-630 |
| A. Required Credits Within Exercise Science |  |
| KAAP 601 Research Methods | 3 |
| KAAP 602 Data Analysis and Interpretation in Health Sciences | 3 |
| KAAP 655 Advanced Physiology of Exercise | 3 |
| KAAP 804 Clinical Measures in Exercise Physiology At least one of the following coursesKAAP 675 Exercise Testing and Prescription | 33 |
| KAAP 802 Human Cardiovascular Control | 3 |
| Total from Area A | 15-18 |
| B. A minimum of 2 courses from the following: KAAP 607 Motor Learning and Control | 3 |
| KAAP 615 Advanced Mammalian Physiology I | 3 |
| KAAP 616 Advanced Mammalian Physiology II | 3 |
| KAAP 650 Life Span Motor Development | 3 |
| KAAP 651 Neurophysiological Basis of Movement | 3 |
| KAAP 665 12-Lead ECG Interpretation | 3 |
| KAAP 666 Special Problem | 1-6 |
| KAAP 675 Exercise Testing and Prescription | 3 |
| HDFS 605 Impact of Aging on the Family | 3 |
| BISC 675 Cardiopulmonary Physiology | 3 |
| STAT 615 Design and Analysis of Experiments | 3 |
| STAT 617 Multivariate Methods | 3 |
| Total from Area B | 6-9 |
| C. A minimum of 3 credits from the following: |  |
| KAAP 869 Thesis in Exercise Physiology | 6 |
| KAAP 868 Research | 3-6 |
| Total from Area C | 3-6 |

# Master of Science in Exercise Science Concentration: Biomechanics

Biomechanics is an interdisciplinary science that objectively interprets movement in living organisms. Emphasis is placed on techniques of measuring kinematic and kinetic characteristics of living organisms and on mathematical methods of analysis. Students in the MS program in biomechanics are required to conduct research and complete a thesis or faculty approved research project.

|  |  |
| --- | --- |
| Credit Requirements:Credits within Exercise Science | 15-18 |
| Cognate areas outside Exercise Science | 6-9 |
| Research or Thesis | 3-6 |
| Total number of required credits | 30 |
| A. Required Credits Within Exercise Science |  |
| KAAP 601 Research Methods | 3 |
| KAAP 602 Data Analysis and Interpretation in Health Sciences | 3 |
| KAAP 617 Intro. to Laboratory Instrumentation | 3 |
| KAAP 627 Biomechanical Methods At least one of the following courses: KAAP 687 Seminar in Biomechanics | 33 |
| KAAP 688 Electromyographic Kinesiology | 3 |
| Total Credits from Area A |  15-18 |
| B. A minimum of 2 courses from the following: BMSC 686 Mathematics for Biomechanics | 3 |
| KAAP 607 Motor Learning and Control | 3 |
| KAAP 650 Life Span Motor Development | 3 |
| KAAP 651 Neurophysiological Basis of Movement | 3 |
| KAAP 655 Advanced Physiology of Exercise | 3 |
| KAAP 666 Gait Laboratory Internship | 3 |
| MEEG 612 Biomechanics of Human Movement | 3 |
| MEEG 682 Clinical Biomechanics | 3 |
| MEEG 683 Orthopedic Biomechanics | 3 |
| STAT 615 Design and Analysis of Experiments | 3 |
| STAT 617 Multivariate Methods | 3 |
| EDUC 862 Design and Analysis of Experiments | 3 |
| PHYT 604 Functional Anat./Biomechanics | 3 |
| Total Credits from Area B | 6-9 |
| C. A minimum of 3 credits from the following list; |  |
| KAAP 869 Thesis in Biomechanics | 6 |
| KAAP 868 Research | 3-6 |
| Total from Area C | 3-6 |

# Master of Science in Exercise Science Concentration: Motor Control

Motor control is an interdisciplinary science that focuses on neural, physical, and behavioral aspects of the development and regulation of human movement. Emphasis is placed on changes that occur across the lifespan or due to pathology, and adaptations that occur in response to motor learning or exercise training. Students in the MS program in Motor Control are required to conduct research and complete a thesis or faculty approved research project.

|  |  |
| --- | --- |
| Credit Requirements:Credits within Exercise Science | 15 |
| Cognate areas outside Exercise Science | 9-12 |
| Research or Thesis | 3-6 |
| Total number of required credits | 30 |
| A. Required Credits Within Exercise Science KAAP 601 Research Methods | 3 |
| KAAP 602 Data Analysis and Interpretation in Health Sciences | 3 |
| KAAP 607 Motor Learning and Control | 3 |
| KAAP 651 Neurophysiological Basis of Movement | 3 |
| KAAP 808 Seminar in Motor Behavior | 3 |
| Total Credits from Area A | 15 |
| B. A minimum of 3 courses from the following: |  |
| KAAP 615 Advanced Mammalian Physiology I | 3 |
| KAAP 616 Advanced Mammalian Physiology II | 3 |
| KAAP 617 Intro. to Laboratory Instrumentation | 3 |
| KAAP 627 Biomechanical Methods | 3 |
| KAAP 650 Life Span Motor Development | 3 |
| KAAP 666 Special Problem | 3 |
| STAT 615 Design and Analysis of Experiments | 3 |
| STAT 617 Multivariate Methods | 3 |
| EDUC 862 Design and Analysis of Experiments | 3 |
| EDUC 823 Learning and Development | 3 |
| PSYC 612 Human Psychophysiology | 3 |
| PSYC 626 Advanced Neuroanatomy | 3 |
| Total Credits from Area B | 9-12 |
| C. A minimum of 3 credits from the following |  |
| KAAP 869 Thesis in Motor Control | 6 |
| KAAP 868 Research | 3-6 |
| Total from Area C | 3-6 |

# Master of Science in Exercise Science Master of Science in Exercise Science Concentration: Sports Medicine:

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| --- | --- |
| Credit Requirements:Credits within Exercise Science | 18 |
| Cognate areas outside Exercise Science | 6-9 |
| Research or Thesis | 3-6 |
| Total number of required credits |  30 |
| A. Required Credits Within Exercise Science KAAP 601 Research Methods | 3 |
| KAAP 602 Data Analysis and Interpretation in Health Sciences | 3 |
| KAAP 604 Sensorimotor Characteristics of Injury | 3 |
| KAAP 605 Pathoetiology of Musculoskeletal Injury | 3 |
| KAAP 606 Evidence-Based Sports Medicine KAAP - 609 - Concussion Pathology & ManagementTotal Credits from Area A 18 | 3318 |
| B. A minimum of 2 courses from the following:(At least 2 courses must come from the same cognate area) Motor ControlKAAP 607 Motor Learning and Control | 3 |
| KAAP 650 Life Span Motor Development | 3 |
| KAAP 651 Neurophysiological Basis of Human Movement | 3 |
| KAAP 808 Seminar in Motor Behavior | 3 |
| BiomechanicsKAAP 617 Intro. to Laboratory Instrumentation | 3 |
| KAAP 627 Biomechanical Methods | 3 |
| KAAP 687 Seminar in Biomechanics | 3 |
| KAAP 688 Electromyographic Kinesiology Exercise PhysiologyKAAP 615 Advanced Mammalian Physiology I | 33 |
| KAAP 616 Advanced Mammalian Physiology II | 3 |
| KAAP 655 Advanced Physiology of Exercise | 3 |
| KAAP 665 12 Lead ECG Interpretation | 3 |
| KAAP 675 Exercise Testing and Prescription | 3 |
| KAAP 802 Human Cardiovascular Control | 3 |
| KAAP 804 Clinical Measures in Exercise Physiology BISC 643 Biological Data Analysis | 33 |
| STAT 615 Design and Analysis of Experiments | 3 |
| STAT 617 Multivariate Methods | 3 |
| EDUC 862 Design and Analysis of Experiments | 3 |
| KAAP 666 Special Problem | 3 |
| KAAP 840 Advanced Human Anatomy | 3 |
| Total Credits from Area B | 6-9 |
| C. A minimum of 3 credits from the following |  |
| KAAP 869 Thesis in Sports Medicine | 6 |
| KAAP 868 Research | 3-6 |
| Total from Area C | 3-6 |

## Master of Science in Exercise Science Concentration: Clinical Exercise Physiology

The concentration in Clinical Exercise Physiology will provide students with the opportunity to develop an in depth knowledge of and hands-on experiences in preventive and rehabilitative practices for patients with cardiopulmonary, metabolic, and musculoskeletal diseases as well as apparently healthy and low risk populations. Clinicians will act as part of a health care team that develops exercise recommendations, administers diagnostics tests and provides guidance that promotes healthy lifestyles. The concentration will also help students prepare for the American College of Sports Medicine’s (ACSM) clinical exercise physiology registry examination (RCEP) and/or the ACSM’s clinical exercise specialist certification, which focuses on cardiovascular and pulmonary rehabilitation. This program offers core requirements that must be completed by all students, and elective courses that permit the student to choose courses in areas of interest to them. The Clinical Exercise Physiologist Specialization is designed to be a 2 year, non-thesis program. Students wishing to pursue research careers or doctoral degrees may choose to complete the thesis requirements in Exercise Physiology.

|  |  |
| --- | --- |
| Credit Requirements:Credits within Exercise Science | 15 |
| Elective Credits | 9 |
| Internship | 9 |
| Total number of required credits | 33 |
| A. Courses Required within Exercise ScienceA minimum of 15 credits of coursework from the following list: KAAP 655 Advanced Exercise Physiology | 3 |
| KAAP 665 12 Lead ECG Interpretation | 3 |
| KAAP 675 Exercise Testing and Prescription | 3 |
| KAAP 615 Advanced Mammalian Physiology I | 3 |
| KAAP 616 Advanced Mammalian Physiology II | 3 |
| KAAP 804 Clinical Measures in Exercise Physiology | 3 |
| Total from Area A | 15 |
| B. A minimum of 3 courses from the following: KAAP 651 Neurophysiological Basis of Movement | 3 |
| NTDT 615 Advanced Nutrition and Physical Activity | 3 |
| NTDT 640 Nutrition and Aging | 3 |
| NTDT 680 Exercise, Nutrition and Bone Health | 3 |
| KAAP 802 Human Cardiovascular Control | 3 |
| HLPR 809 Health Behavior | 3 |
| HLPR 815 Health and Older Adults | 3 |
| Total from Area B | 9 |
| C. InternshipKAAP 671 Clinical Exercise Physiology Internship | 9 |
| Total from Area C | 9 |

1. Graduate Program Review of the College of Physical Education, Athletics and Recreation at the University of Delaware, John Billing, University of North Carolina, Richard Nelson, Pennsylvania State University, Robert Singer, University of Florida, May, 1988. [↑](#footnote-ref-1)