

# LONG SIGNATURE SHEET



Proposal Number: KNES 3-14-12

Proposal Title Revision of the Clinical Exercise Physiology MS Program

Originating Department Kinesiology

TYPE OF PROPOSAL: UNDERGRADUATE \_\_\_\_\_ GRADUATE XXX \_\_\_\_\_ UNDERGRADUATE & GRADUATE \_\_\_\_\_  
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
			<i>Approved</i>	DEPARTMENT CHAIR  Print name: Yvette Huet
			<i>Approved</i>	COLLEGE CURRICULUM COMMITTEE CHAIR  Print name: Michael Thompson
			<i>Approved</i>	COLLEGE FACULTY CHAIR  Print name: Cynthia Toth
			<i>Approved</i>	COLLEGE DEAN  Print name: Nancy Fey-Yensan
			<i>Approved</i>	UNDERGRADUATE COURSE & CURRICULUM COMMITTEE CHAIR (for undergraduate courses)
			<i>Approved</i>	GRADUATE COUNCIL CHAIR (for graduate courses)
			<i>Approved</i>	FACULTY GOVERNANCE SECRETARY (noting Faculty Council approval on Consent Calendar)
				FACULTY EXECUTIVE COMMITTEE (if decision is appealed)

University of North Carolina at Charlotte

**Type:** New Graduate

**Course & Curriculum Proposal from:** Kinesiology

**Title:** Revision of the Clinical Exercise Physiology MS Program

**A. Proposal Summary and Catalog Copy**

**1. Summary:** The Kinesiology (KNES) Department proposes to do the following:

- a. Rename the program to: Kinesiology
  
- b. Create 2 concentrations within the new MS program in Kinesiology: Clinical Exercise Physiology and Applied Physiology and Neuromechanics.
  
- c. Have an early-entry option for the Applied Physiology and Neuromechanics concentration.
  
- d. Create 3 new courses
  1. KNES 6115 Research Methods in Kinesiology
  2. KNES 6151 Exercise Testing Methods
  3. KNES 6170 Neuromechanics of Gait & Posture
  
- e. Provide greater flexibility in the two options for the current MS program that clearly separate the option in which students take the Clinical Exercise Physiology exam vs the thesis option.
  
- f. Change the designation of the degree from CEXP to KNES to more accurately reflect that there is both an exam option and a thesis option.

**2. Proposed Catalog Copy:** On the subsequent pages is a list of the proposed changes to the catalog copy. Tracked notations indicate changes, additions, and/or deletions to KNES graduate course offerings and/or programmatic changes relative to the current undergraduate and graduate catalog.

## UNDERGRADUATE CATALOG CHANGES:

At the end of the current catalog copy:

### EARLY-ENTRY INTO M.S. IN KINESIOLOGY PROGRAM

The Early-Entry program leads to completion of all requirements for the B.S. and M.S. degrees in only five academic years and one or two summers. In this program, students complete requirements for the B.S. degree and begin graduate coursework and research in their Senior, or fourth, year. The Kinesiology Early-Entry program is accelerated; that is, up to twelve credit hours may be taken at the graduate level and double counted towards both the undergraduate and graduate degrees. Students may leave the program after four years with the B.S. degree, or they may complete an additional academic year and summer of full-time study and research to earn both the B.S. and M.S. degrees in Kinesiology.

#### ADMISSION REQUIREMENTS

B.S. students may be admitted to the M.S. program without entrance examinations if they have a 3.25 overall GPA and at least 3.25 in the major, have completed the standard B.S. curriculum with 75 credit hours, and have taken the Graduate Record Examination. The application process and all the required documentation (e.g., test scores, transcripts, letters of recommendation) are the same for Early-Entry students as for other applicants to the program. The status of the accepted early-entry applicant is provisional pending the award of the baccalaureate degree (including sitting for examinations required by their B.S. program). Early-Entry M.S. students will be expected to complete the requirements for the undergraduate degree by the time they have completed 15 hours of graduate work. Students should consult with the Kinesiology M.S. Graduate Coordinator about their eligibility for this program and to discuss requirements for selection of a research advisor during their Junior year.

## GRADUATE CATALOG COPY CHANGES

IN THE SECTION ENTITLED: “Related Courses”

**KNES 6099. Special Topics in Kinesiology. (1-3)** Topics and special problems related to issues, practices or sufficient trends in Kinesiology. Institutes, workshops, seminars and independent studies. Course may be repeated for credit as topics vary. *(Fall, Spring, Summer)*

**KNES 6115. Research Methods in Kinesiology. (3)** Methods of inquiry for research will be explored and critiqued within the fields of Kinesiology. Emphasis is on developing skills useful for conducting and evaluating basic, applied, and clinical. *(Fall )*

**KNES 6120. Advances in Clinical Exercise Physiology. (3)** This course introduces students to concepts and topics associated with Clinical Exercise Physiology, including areas of practice in Clinical Exercise Physiology and professional development. *(Fall)*

**KNES 6121. Clinical Practice in Exercise Physiology. (3)** Knowledge and skills required in the clinical setting including operational standards, examination of current drug therapies, and legal and social considerations related to practice as a Clinical Exercise Physiologist. *(Fall)*

**KNES 6134. Exercise Prescription for Cardiopulmonary and Metabolic Disorders. (3)** Study of responses and adaptations to exercise, assessment techniques, exercise prescription, leadership and programming. *(Spring)*

**KNES 6151. Exercise Testing Methods. (3)** This course aims to introduce the basic Exercise Testing methods used by Clinical Exercise Physiologists. The course will focus on the theory and application of specific skills as well as developing clinical proficiency in assessing outcomes of physiologic function and fitness. *(Spring)*

**KNES 6170. Neuromechanics of Gait & Posture (3).** The influence of central and peripheral mechanisms on gait and posture will be emphasized by reviewing experimental protocols that have perturbed human movement. Instruction will include both normal and pathological studies and the effect that interventions may have on disturbances in gait and posture. *(Fall)*

**KNES 6232. Physiology of Human Aging. (3)** This course focuses on the normal physiological alterations that occur as the human progresses from a young adult to the latter stages of life. Special attention is given to interventions commonly promoted to combat the physiological changes that result from aging. *(Fall)*

**KNES 6260. Clinical Exercise Nutrition. (3)** Principles of nutrition, dietary guidelines, dietary relationships to diseases and health, special populations, computerized dietary analysis. (~~O#~~ demandFall)

**KNES 6280. Advanced Exercise Physiology. (3)** Advanced study of the functioning of physiological systems during exercise with emphasis on current literature and research. *(Spring)*

**KNES 6285. Advanced Cardiopulmonary Physiology. (3)** This course is designed to develop a thorough understanding of cardiovascular physiology, ECG interpretation, and health-related applications. This course examines in detail, the various parameters of the cardiovascular system, the implication of disease and structural abnormalities to these parameters, and the relationship of cardiovascular function to exercise adaptation. Emphasis will be placed on usage of the information in the clinical setting. *(Spring)*

**KNES 6292. Exercise Prescription for Musculoskeletal Disorders. (3)** Advanced study of the clinical applications of common therapeutic modalities and rehabilitation in the treatment of athletic related injuries and illnesses associated with physical activity. *(Summer)*

**KNES 6490. Advanced Practicum in Clinical Exercise Physiology. (1)** Prerequisite: Permission of instructor. Acquisition and application of knowledge, skills, and abilities necessary for the Registered Clinical Exercise Physiologist while gaining experiential hours in an appropriate clinical setting. Three (3) credit hours of Advanced Practicum are required for graduation; this course may be repeated for up to 6 credit hours. (~~Every semester~~Fall, Spring, Summer)

**KNES ~~6469~~6800. Directed Independent Study. (1-3)** Directed study in areas of specialization in ~~Clinical Exercise Physiology~~Kinesiology and related fields. Graded on a Pass/Unsatisfactory basis only. (~~Every semester~~Fall, Spring, Summer)

~~KNES 6899. Special Topics in Kinesiology. (1-6) Topics and special problems related to issues, practices or sufficient trends in Kinesiology. Institutes, workshops, seminars and independent studies. Course may be repeated for credit as topics vary. (Every semester)~~

**KNES 6900. Research and Thesis in Kinesiology. (3)** Prerequisite: ~~KNES 6115~~completion of at least 24 hours of graduate program; and permission of instructor overseeing thesis research. Design, implementation, presentation, and evaluation of an approved research project in student's specialty area. The applied project is ~~of the student's own design~~ under the supervision of an advisor and graduate committee. Graded Pass/Unsatisfactory only. (Fall, Spring, Summer~~Every semester~~)

**KNES 7999. Master's Degree Graduate Residency Credit. (1)** Meets Graduate School requirement for continuous enrollment during final term prior to graduation when all coursework has been completed. (Fall, Spring, Summer~~Every semester~~)

### IN THE SECTION ENTITLED: "Degree Programs Offered"

#### ~~Clinical Exercise Physiology~~Kinesiology

#### • **M.S. in ~~Clinical Exercise Physiology~~Kinesiology**

Department of Kinesiology

226A Belk Gym

704-687-~~4695~~0873

kinesiology.uncc.edu

#### **Graduate Program Coordinator**

Dr. ~~Susan Tsivitse~~Peter Magnussen

#### **Graduate Faculty**

Susan Arthur, Assistant Professor

Reuben Howden, Assistant Professor

Tricia J. Hubbard-~~Turner~~, ~~Assistant~~ociate Professor

Peter Magnusson, Professor ~~Susan Tsivitse, Assistant Professor~~

Michael J. Turner, Associate Professor

Erik A. Wikstrom, Assistant Professor

## **MASTER OF SCIENCE IN CLINICAL EXERCISE PHYSIOLOGY/KINESIOLOGY**

The Master of Science in Kinesiology program prepares graduate students to advance the fields of Kinesiology through evidenced-based patient care and translational research. The program emphasizes basic and clinical interdisciplinary education and research in areas of Kinesiology that include:

- Biological Signals
- Biomechanics
- Exercise Prescription
- Genomics
- Human Pathophysiology
- Motor Learning & Control
- Nutrition
- Physiology of Aging
- Rehabilitation Sciences
- Systems Physiology

The Department of Kinesiology has two concentrations within the M.S. in Kinesiology program that include a clinical (non-thesis) and research (thesis) degree option.

### 1. Applied Physiology and Kinesiology (Thesis required)

The Applied Physiology and Kinesiology concentration is excellent preparation for those planning to continue their education through the PhD, either in Kinesiology or a related field (Biology, Rehabilitation Sciences, Biomechanics, Motor Control, Physiology, etc). Students selecting this Concentration will also be well qualified for employment in aspects of the health industry or in research labs. An early-entry option is available for well qualified UNC Charlotte undergraduate students majoring in Exercise Science or Athletic Training. The early-entry option allows students to begin work toward a graduate degree before completion of the baccalaureate degree. (described in the [UNC Charlotte Undergraduate Catalog](#)).

### 2. Clinical Exercise Physiology (Non-thesis)

The Clinical Exercise Physiology concentration is a CAAHEP-accredited program that is designed to prepare students to become Registered Clinical Exercise Physiologists. Clinical Exercise Physiologists are employed in inpatient and outpatient clinical/rehabilitation settings (e.g. Cardiopulmonary Rehab programs), general wellness/fitness commercial and corporate settings, and industrial settings that provide health care services for both diseased and healthy populations. Through a blend of classroom instruction and clinical experience, the degree program teaches a wide variety of specific health care skills, knowledge, and behaviors within the cardiovascular, pulmonary, metabolic, neoplastic, musculoskeletal, neuromuscular, and immunologic practice areas. An early-entry option is available for well qualified UNC Charlotte undergraduate students majoring in Exercise Science or Athletic Training. The early-entry option allows students to begin work toward a graduate degree before completion of the baccalaureate degree. (described in the [UNC Charlotte Undergraduate Catalog](#)).

A ~~complete~~ description of the program, concentrations, and course offerings ~~sequence of courses~~ can be found at [kinesiology.uncc.edu](http://kinesiology.uncc.edu).

## **Degree Requirements**

Both concentrations require 36 credit hours approved by the Department of Kinesiology and a minimum of 15 credit hours presented for the degree must be in the courses numbered 6000 and above. Both concentrations require the same 12h of core courses but differ in their specific courses and the number of elective hours. Courses for which undergraduate credit has been awarded may not be repeated for graduate credit. A minimum grade point average of 3.0 is required on all coursework attempted for the degree. At the time of admission up to 6 semesters hours of graduate transfer credit may be accepted if approved by the Department of Kinesiology and the Graduate School.

### **MS in Kinesiology Core Courses (12 hours)**

KNES 6115 Research Methods in Kinesiology (3)

KNES 6232 Physiology of Human Aging (3)

KNES 6280 Advanced Exercise Physiology (3)

KNES 6285 Advanced Cardiopulmonary Physiology (3)

### **Applied Physiology & Neuromechanics Concentration Concentration Specific Courses (15 hours)**

RSCH 6110 Descriptive & Inferential Statistics (3)

KNES 6170 Neuromechanics of Gait & Posture (3)

KNES 6800 Directed Independent Study (3)

KNES 6900 Research & Thesis in Kinesiology (6)

### **Applied Physiology & Neuromechanics Elective Courses (9 hours)**

### **Clinical Exercise Physiology Concentration**

#### **-Concentration Specific Courses (18 hours)**

KNES 6120 Advances in Clinical Exercise Physiology (3)

KNES 6121 Clinical Practice in Exercise Physiology (3)

KNES 6134 Exercise Prescription for Cardiopulmonary & Metabolic Disorders (3)

KNES 6151 Exercise Testing Methods (3)

KNES 6292 Exercise Prescription for Musculoskeletal Disorders (3)

KNES 6490 Advanced Practicum in Clinical Exercise Physiology (1) (taken 3 times)

Each Practicum credit is equivalent to 200 clinical hours. Clinical practicum usually begins in the third semester of the student's program and are arranged through the Practicum Coordinator within the Department of Kinesiology.

### **Clinical Exercise Physiology Elective Courses (6 hours)**

### **Comprehensive Examination**

All candidates for the degree must pass a comprehensive examination. A student selecting the Applied Physiology and Neuromechanics concentration must present credit for at least 6 credit hours of KNES 6900 and pass a thesis defense. A student selecting the Clinical Exercise Physiology concentration must pass the Registered Clinical Exercise Physiologist examination (RCEP), administered by the American College of Sports Medicine as this concentration prepares students to become Clinical Exercise Physiologists.

### **Additional Admissions Requirements**

In addition to fulfilling the university's general requirements for graduate admission at the Master's level, applicants seeking admission in to the MS in Kinesiology program must also:

1) Present satisfactory scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT)

Combined math and verbal score of 300 or greater and a writing score 3.5 or better.

2) Possess an overall cumulative GPA of 3.0-25 or better in all college coursework and possess an overall GPA of 3.25 on all upper division coursework (courses completed in the Junior and Senior year of their undergraduate program)

3) Present satisfactory grades (C or better) on specific pre-requisite courses

- Applied Physiology & Neuromechanics requires Successful completion (grade of C or above) of a minimum of 4 credit hours of Anatomy and Physiology, 3 credit hours of Exercise Physiology, 3 credit hours of Biomechanics or Motor Control, 3 credit hours of Exercise Prescription, and 3 credit hours of Statistics

- Clinical Exercise Physiology requires a minimum of 4 credit hours of Anatomy and Physiology, 3 credit hours of Exercise Prescription, and 3 credit hours of Statistics

4) Present satisfactory scores on the Test of English as a Foreign Language, if the applicant is from a non-English speaking country.

5) Demonstrate evidence of sufficient interest, ability, and preparation in Kinesiology to adequately profit from graduate study, as determined by the Kinesiology Graduate faculty. This information should be included in the statement of purpose and specifically speak to the following: a) strengths, b) concentration of interest, c) career aspirations, and d) research interests (if pursuing the Applied Physiology and Neuromechanics concentration)

### **Assistantships**

Positions as a graduate assistant or teaching assistant may be available. Grant funded assistantships may be available as well. Students seeking assistantships should contact the Graduate Coordinator of the ~~Clinical Exercise Physiology~~Kinesiology program. In general, graduate assistantship awards for the academic year are made by the preceding ~~March~~April 15.

### **Tuition Waivers**



Tuition waivers may be available through a variety of sources. Students interested in pursuing tuition waivers should contact the Graduate Coordinator in the semester *prior* to enrolling for courses.

### **Financial Aid/Financial Assistance**

A wide range of opportunities for financial aid/assistance is available to qualifying students, which may be accessed through the financial aid office. See the financial information section of this graduate catalog for more information on the opportunities that are available, and how to contact the financial aid office.

### **Advising**

Each student in the MS in Kinesiology program must have a major advisor. Students in the Applied Physiology and Neuromechanics concentration will work with their major advisor to develop an advisory committee. The advisory committee must have at least 3 members (including the major advisor) and the majority of which must be from the Department of Kinesiology. Students in the Clinical Exercise Physiology concentration will be advised by the Program Coordinator and Practicum Coordinator. Upon acceptance into the program, an academic advisor is assigned to each student. Students are expected to meet with their advisors on a regular basis to plan their progression through their program of study. Any course substitution must be approved by the academic advisor.

### **Research Opportunities/Experiences**

A range of research opportunities exist in the Department of Kinesiology for qualified students. Students are encouraged to become engaged in the research focus of the department.

### **Program Certifications/Accreditations**

Completion of the clinical-Clinical exercise-Exercise physiology-Physiology specialty concentration qualifies the graduate to take the Clinical Exercise Physiology Registry Examination (RCEP) administered by the American College of Sports Medicine.

## **B. Justification**

1. Need Addressed by the Proposal: Over the past 5 years, the field of KNES as a whole has undergone a paradigm shift toward evidence based practice. As a result, more and more KNES undergraduate students from UNC Charlotte and other institutions are pursuing thesis based MS degrees that prepare them to critique and perform translational and clinical research in the fields of KNES. While the Department of Kinesiology at UNC Charlotte offers a MS program in Clinical Exercise Physiology, the thesis option is not well described and currently requires the same courses to be completed as the clinical option including the practicum which no longer makes sense in the thesis option. Therefore, the department and university lose a number of our own high quality students who are interested in Applied Physiology and Neuromechanics to other institutions each year. Further, we are failing to attract high quality students from other institutions despite growth in the number of KNES research faculty and KNES research productivity. The proposed actions of revising the current KNES masters program to more clearly delineate the differences between the clinical and research (thesis based) concentration would achieve two major goals. First and most importantly, it would provide a quality concentration that would prepare students for the evidence-based fields of KNES or further education via a PhD program. Specifically, the new thesis-based concentration will: 1) further develop the student's content knowledge of Kinesiology, 2) develop the student's knowledge of research methodology and statistical analyses, and 3) give them firsthand experience with the research that is driving the paradigm shift to evidence based practice. Secondly, the revision would allow UNC Charlotte to retain and attract more high quality students to the KNES masters program. The proposed revision also fits with the mission of the unit, College of Health and Human Services, and the university.

2. Pre-requisites/co-requisites: As indicated in the proposed catalog copy, pre- and co-requisites are minimal in the revised masters program. Two courses have course pre-requisites (RSCH 6110 & KNES 6900) and both require KNES 6115 to be taken first. One additional course (KNES 6490) requires instructor permission. Recommended course sequencing will be demonstrated by the graduate catalog, student handbook, and through meetings with the program coordinator.

3. Course Numbering: Course numbering of new courses is consistent with the recommendations of the University and changes were made to established courses when numbering was inconsistent.

4. Improving scope, quality and/or efficiency: This proposal will improve the scope, quality, and efficiency of graduate course offerings in the Department of KNES. Specifically, this proposal will broaden the scope of courses offered (3 new courses) which will increase the number of electives available for students in both concentrations as well as other graduate programs on campus (e.g. Gerontology, Biology, Applied Physics). Finally, the efficiency of the current MS program will be enhanced through increased enrollment via the thesis based concentration (Applied Physiology and Neuromechanics).

### C. Impact:

1. Groups of students will be served by this proposal: The primary beneficiaries of this proposal will be undergraduate students in the Department of KNES (EXER and ATRN majors) because this will provide them with a thesis based masters program in the field of KNES. These students will be further served by the early-entry option which can save students time and money when pursuing a master's degree. Other groups of students will also benefit from this proposal. Specifically, students currently in the Clinical Exercise Physiology masters program (proposed to make this a concentration) will have additional course offerings to choose from for electives. Similarly, students in other graduate programs such as Gerontology, Biology, and Applied Physics could also benefit.

#### 2. Effect on Existing Courses and Curricula:

##### *a. When will new courses be taught?*

All three of the new courses will be taught annually. Two of the new courses (KNES 6115 and KNES 6170) will be offered in the fall semester while KNES 6151 will be offered in the spring semester.

##### *b. How will the content and frequency of other courses be impacted?*

Content and frequency of current KNES undergraduate and graduate courses will not be affected by the proposal.

##### *c. What is the anticipated enrollment in courses added?*

The anticipated enrollment for KNES 6115 (Research Methods in KNES) is anticipated to be between 15-20 each year as this course will be taken by students in both concentrations (Clinical Exercise Physiology and (Applied Physiology and Neuromechanics). Enrollment in KNES 6151 (required for Clinical Exercise Physiology concentration) is anticipated to remain at 10-14 students based on enrollment numbers when the course was offered as a special topics course. During the first few years of the (Applied Physiology and Neuromechanics concentration, we anticipate enrollment for KNES 6170 (Neuromechanics of Gait and Posture) to be between 5-7 with enrollment growing to greater than 15 students over time.

##### *d. How will enrollment in other courses be impacted?*

Immediately, we anticipate that enrollment will increase by 5-7 students in RSCH 6110, KNES 6280, KNES 6232, and KNES 6285. Courses chosen by students in the Applied Physiology and Neuromechanics concentration as electives will see smaller increases.

##### *e. If courses have been offered previously under special topics numbers, give details.*

KNES 6151 has been offered as a special topics course. When offered, enrolled was ~10-14 students and the course content was well received by the students based on student evaluations. KNES 6115 (Research Methods in Kinesiology) has been offered previously as a section of NURS 6160. This section of NURS 6160 would regularly enroll 10-15 students and has been well received based on student evaluations.

##### *f. Other areas of catalog copy that will be impacted*

See section A2.

**D. Resources****1. Personnel:** None*a. Requirements for new faculty and load on current faculty*

New faculty joining the department of Kinesiology wishing to participate in the Kinesiology MS program would need to meet the Graduate Faculty criteria as established by the Department of Kinesiology. In short, hold the appropriate terminal degree (PhD or EdD) for their academic discipline, show evidence of past and current, regular and consistent creative or scholarly contributions (average 2 first/senior author publications in peer-review journals with an impact factor of >1 over a three year period), and be actively involved in graduate education.

*b. Qualified faculty members interested in teaching the new courses*

## 1. KNES 6115: Research Methods in Kinesiology

Susan Arthur, Assistant Professor

Peter Magnusson, Professor

Trudy Moore-Harrison, Lecturer (Associate Grad Faculty)

Erik Wikstrom, Assistant Professor

## 2. KNES 6151: Exercise Testing Methods

Susan Arthur, Assistant Professor

Reuben Howden, Assistant Professor

Trudy Moore-Harrison, Lecturer (Associate Grad Faculty)

## 3. KNES 6170: Neuromechanics of Gait &amp; Posture

Tricia Hubbard-Turner, Associate Professor

Peter Magnusson, Professor

Erik Wikstrom, Assistant Professor

**2. Physical Facility:** None

Classroom space and time for an additional course is available within Belk Gymnasium. Further, the available space is adequate for the new courses.

**3. Equipment & Supplies:** None

KNES 6115 needs no new materials. Equipment for KNES 6151 is housed in the Exercise Physiology Laboratory and is already available for instructional use. Equipment needed for KNES 6170 are housed within the Biodynamics Research Lab and will be available for instructional use.

**4. Computers:** None

The College of Health & Human Services already has a student computer laboratory. All faculty have personal computers and no new faculty are requested as part of this proposal.

5. Audio-Visual: None

The College of Health & Human Services already has several audio/visual recording and editing rooms.

6. Other Resources: None

No additional resources are requested for travel, communication, or printing. Existing budgets will be used to update new materials to reflect multiple concentrations within the proposed MS program in Kinesiology.

7. Sources of Funding: None

Not Applicable as new resources are not needed.

**E. Consultation**

1. Library Consultation: Completed

Consultation was requested on February 23<sup>rd</sup> 2012 and completed on February 28<sup>th</sup>, 2012. The results indicate that library holdings are adequate for the proposed revisions. The consultation form is attached.

2. Consultation with other units: Completed

Consultation with the College of Education was requested on February 23<sup>rd</sup> 2012 and completed on February 23<sup>rd</sup> 2012. The College of Education, specifically the Department of Educational Leadership supported the portions of the proposal that would impact their course offerings (RSCH 6110) and enrollment.

**F. Initiation & Consideration of the Proposal**

1. Originating Unit

A committee was formed in the Spring of 2012 to revise the MS program Clinical Exercise Physiology based on the recommendations of the graduate faculty. These revisions included developing new Student Learning Outcomes for the proposed new Applied Physiology and Neuromechanics concentration (see attached appendix). The Student Learning Outcomes for the Clinical Exercise Physiology concentration will remain unchanged. The committee put forward their recommendations to the KNES faculty as a whole on 3-14-2012. The recommendations were approved unanimously. This document represents the recommendations that the committee put forward to the faculty.

2. Other Considering Units

An email request was sent to the College of Education, on February 23, 2012. This email indicated the portions of the proposal that would impact the College of Education, requested approval of said portions of the proposal, and offered to provide additional information as needed. A response email was received on 2-23-2012 (see attachment) indicating support of the current proposal.

**G. Attachments**

1. Consultation documents

- a. Library Consultation Form
- b. College of Education: Department of Educational Leadership Consultation

2. Grad Syllabus

- KNES 6115 Research Methods in Kinesiology
- KNES 6151 Exercise Testing Methods
- KNES 6170 Neuromechanics of Gait & Posture

3. Student Learning Outcomes Template

- Clinical Exercise Physiology concentration
- Applied Physiology & Neuromechanics concentration



UNC CHARLOTTE  
Murrey Atkins Library

Consultation on Library Holdings

To: Jean Hiebert  
From: Erik Wikstrom  
Date: 02/23/12  
Subject: MS Program in Kinesiology

Summary of Librarian's Evaluation of Holdings:

Evaluator: Jean Hiebert Date: 2-28-12

Please Check One:

- Holdings are superior
- Holdings are adequate
- Holdings are adequate only if Dept. purchases additional items.
- Holdings are inadequate

Comments:

There are areas that need improvement and they will be addressed in the next ordering cycle. Overall, Atkins has very good materials in support of the proposed degree.

Jean Hiebert  
Evaluator's Signature

2-28-12  
Date

Revised 4/08/03  
OAA jdp

## Wikstrom, Erik

---

**From:** Hancock, Dawson  
**Sent:** Thursday, February 23, 2012 6:30 PM  
**To:** Wikstrom, Erik  
**Cc:** Spooner, Melba; Hefti, Becca  
**Subject:** Re: Consultation Regarding Graduate Program Revision

Erik:

We'd be happy to have your students in RSCH 6110. That course is often co-listed and co-taught with the doctoral version of the course (RSCH 8110), but the faculty members who teach the course know how to differentiate instruction by level of the students.

Because all of our RSCH courses require authorizations to enroll, your students will need to contact our Office Manager, Ms. Becca Hefti (704.687.8857), for those authorizations. And so that Ms. Hefti knows to whom to issue authorizations, please send me the students' names and 800 numbers prior to each spring semester.

As you point out, the prerequisite for RSCH 6110 is RSCH 6101 or equivalent, so Ms. Hefti will be checking to make sure that your students have completed that equivalent course in your program before she issues authorizations for RSCH 6101.

Please let me know at any time if you have any questions.

Dawson

On Feb 23, 2012, at 3:51 PM, "Spooner, Melba" <[mcspoone@uncc.edu](mailto:mcspoone@uncc.edu)> wrote:

Dear Erik,

I am forwarding your email to Dr. Dawson Hancock, Chair of the Department of Educational Leadership where the research (RSCH) courses "live." He will provide consultation with you regarding RSCH 6110.

All the best.

---

Melba Spooner, Associate Dean  
UNC Charlotte | College of Education  
9201 University City Blvd. | Charlotte, NC 28223  
Phone: 704-687-8704 | 704-687-4705  
[mcspoone@uncc.edu](mailto:mcspoone@uncc.edu) | <http://www.uncc.edu>

If you are not the intended recipient of this transmission or a person responsible for delivering it to the intended recipient, any disclosure, copying, distribution, or other use of any of the information in this transmission is strictly prohibited. If you have received this transmission in error, please notify me immediately by reply e-mail or by telephone at 704-687-8704. Thank you.

---

**From:** Wikstrom, Erik  
**Sent:** Thursday, February 23, 2012 3:14 PM  
**To:** Spooner, Melba  
**Subject:** Consultation Regarding Graduate Program Revision



Dr. Spooner,

I am chairing a Kinesiology committee charged with revising our MS program in Clinical Exercise Physiology. As part of the revisions, we would like to require students in one of the proposed concentrations to take a statistics course. Based on our research we have identified RSCH 6110 (Descriptive and Inferential Statistics) as the most appropriate course. Would the College of Education be alright with a small enrollment increase in that particular class? We envision between 5 and 10 students would take this course annually in the spring semester. These students would complete the Kinesiology Research Methods course in the preceding fall term to satisfy the prerequisite of RSCH 6101 or equivalent. Please let me know if there is any additional information that I can provide.

Thank you for your time  
Erik

---

Erik Wikstrom, PhD, ATC, FACSM | Assistant Professor  
UNC Charlotte | Department of Kinesiology  
9201 University City Blvd. | Charlotte, NC 28223  
Phone: 704-687-0871 | Fax: 704-687-0930  
[ewikstrom@uncc.edu](mailto:ewikstrom@uncc.edu) | <http://www.kinesiology.uncc.edu>

---

If you are not the intended recipient of this transmission or a person responsible for delivering it to the intended recipient, any disclosure, copying, distribution, or other use of any of the information in this transmission is strictly prohibited. If you have received this transmission in error, please notify me immediately by reply e-mail or by telephone at 704-687-3764. Thank you.

The University of North Carolina at Charlotte  
College of Health and Human Services  
Department of Kinesiology

\*\*\*\*\*

**Course Number:** KNES 6115  
**Course Title:** Research Methods in Kinesiology  
**Credit Hours:** 3 credit hours  
**Pre and co-requisites:** Enrollment in the graduate Kinesiology program

Meeting Days & Times: TBD  
Class location: TBD

**Instructor:** TBD  
**Office Location:** TBD  
**Office Hours:** TBD  
**Telephone number:** TBD  
**E-mail address:** TBD

**Course Description:** Methods of inquiry for research will be explored and critiqued within the fields of Kinesiology. Emphasis is on developing skills useful for conducting and evaluating basic, applied, and clinical.

**Course Objectives:** At the completion of this course the student will be able to:

- Describe and apply various research designs to specific research questions
- Review and critically analyze the research literature
- Understand and apply inferential statistics in research
- Understand the elements of a master's thesis research proposal
- Develop a master's thesis proposal

**Required Text:** TBD but possible texts include

Baumgartner, TA and Hensley, LD. Conducting and Reading Research in Health and Human Performance, 4<sup>th</sup> ed. McGraw Hill Publishing, 2006

Berg, KE and Latin RW. Essentials of Research Methods in Health, Physical Education, Exercise Science, and Recreation, 3<sup>rd</sup> ed. Lippincott Williams and Wilkins, 2008

Hurley WL, Denegar CR, and Hertel J. Research Methods: A Framework for Evidence-Based Clinical Practice. Lippincott Williams and Wilkins, 2011.

**Grading Scale:**

>90%: A

80-89%: B

70-79%: C

<69%: U (Unsatisfactory)

**Evaluation Methods:**

The student's final grade is based on the cumulative number of points earned in class:

Evaluation Type	Number	Points Each	Total
Midterm Exam	1	100	100
Mock Thesis Paper	1	120	100
Mock Thesis Presentation	1	40	50
Final Exam	1	100	100
Total			350

**EVALUATION GUIDELINES:**

Exams (Midterm and Final): Written exams will vary in format. Multiple-choice, true-false, matching, fill in the blank, short answer and essay questions can be utilized. All material from the notes, text, handouts, discussions, presentations, etc is test eligible. The final exam will be comprehensive.

Mock Thesis Paper: You will be required to write the 1<sup>st</sup> 3 chapters of a Master's thesis. These include, the Introduction to the problem (CH 1), the literature review (CH 2), and the methodology (CH 3). The document should follow the guidelines established by the graduate school at UNC Charlotte.

Mock Thesis Presentation: You will be required to make a presentation (with power point) that summarizes your thesis proposal. The presentation should be 12-15 minutes in length and should include a summary of the literature, a purpose statement, your hypotheses, and the methodology you will use to answer your research question.

## UNIVERSITY, COLLEGE AND DEPARTMENTAL POLICIES\*

### University Policies:

#### **Code of Student Responsibility:**

“The *UNC Charlotte Code of Student Responsibility* (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code” (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address:

**<http://legal.uncc.edu/policies/ps-104.html>**

#### **Academic Integrity:**

Students have the responsibility to know and observe the requirements of The UNC Charlotte Code of Student Academic Integrity. This code forbids cheating, fabrications, or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. Academic evaluations in this course include a judgment that the student’s work is free from academic dishonesty of any type; and grades in this course therefore should be and will adversely affected by academic dishonesty. Students who violate the code can be expelled from UNC Charlotte. The normal penalty for a first offense is zero credit on the work involving dishonesty and further substantial reduction in the course grade. In almost all cases the course grade is reduced to F. Copies of the code can be obtained from the Dean of Students Office or <http://legal.uncc.edu/policies/ps-105.html>. Students are expected to report cases of academic dishonesty to the course’s instructor.

**Special Needs:** If you have a documented disability and require accommodation in this course, contact Disability Services, Fretwell 230, phone: 687 4355 voice/TDD) the first week of the semester. Information about available services may be found at <http://legal.uncc.edu/policies/ps-51.html>. Accommodations for learning will be arranged by that office and communicated to the Instructor. If you speak English as a second language, please inform the instructor.

#### **Diversity Statement:**

UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (<http://www.legal.uncc.edu/policies/ps-61.html>) and the policy on Responsible Use of University Computing and Electronic Communication Resources (<http://www.legal.uncc.edu/policies/ps-66.html>). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

#### **Religious Accommodation:**

It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a [Request for Religious Accommodation Form](#) to their instructor prior to the census date for enrollment for a given semester <http://legal.uncc.edu/policies/ps-134.html> . The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte’s Academic Calendar (<http://registrar.uncc.edu/calendars/calendar.htm>) .

## COURSE OUTLINE

Week	Topic	Reading Assignment	Assignments Due
1	Syllabus & Class Intro, Nature & Purpose of Research Understanding the Research Process & Choosing a Topic	Chapters 1 & 2	
2	The Research Proposal Reviewing the Literature & Evaluating an Article Writing the Literature Review	Chapters 3, 7, & 16	
3	Article Analysis Types of Research Research Design	Chapters 8, 9, & 10	
4	Thesis Idea Presentations		Topic Idea Presentations
5	Sampling Procedures Validity & Reliability Writing Chapters 1 & 3	Chapters 6, 15, & 16	
6	Statistics I & II	Chapters 13 & 14	Thesis Proposal Outline
7	Statistics II & III	Chapters 13 & 14	
8	NO CLASS- STUDENT RECESS		
9	Mid-Term Exam		
10	Ethical Considerations in Research	Chapter 5	
11	Writing Results & Writing Discussions Publication Process & Research Funding	Chapter 17	
12	Evidence Based Medicine		
13	Evidence Based Medicine		
14	Thesis Proposal Presentations		Thesis Papers Thesis Presentations
15	Thesis Proposal Presentations		
16	Thesis Proposal Presentations		
Finals	FINAL EXAM		

\*This schedule is tentative and subject to change. Changes will be emailed to students.\*

The University of North Carolina at Charlotte  
College of Health and Human Services  
Department of Kinesiology

\*\*\*\*\*

**Course Number:** KNES 6151  
**Course Title:** Exercise Testing Methods  
**Credit Hours:** 3 credit hours  
**Pre and co-requisites:** Enrollment in the graduate Kinesiology program

Meeting Days & Times: TBD  
Class location: TBD

**Instructor:** TBD  
**Office Location:** TBD  
**Office Hours:** TBD  
**Telephone number:** TBD  
**E-mail address:** TBD

**Course Description:** This course aims to introduce the basic Exercise Testing methods used by Clinical Exercise Physiologists. The course will focus on the theory and application of specific skills as well as developing clinical proficiency in assessing outcomes of physiologic function and fitness.

**Course Objectives:**

- Understanding of the theoretical principles of behind exercise testing methodology
- Practical knowledge and proficiency in performing assessment of:
  - Blood pressure
  - Heart rate
  - ECG
  - Metabolic testing
  - Body Composition.

**Required Text:** Thompson (ed.) ACSM's Guidelines for Exercise Testing and Prescription, 8<sup>th</sup> edition. Lippincott Williams & Wilkins, 2009 (ISBN: 978-0781769037)

## Grading Scale:

>90%: A

80-89%: B

70-79%: C

<69%: U (Unsatisfactory)

## Evaluation Methods:

The student's final grade is based on the cumulative number of points earned in class:

### Graded Items

A. Documented measurements	400 points	(100 points for each measurement category)
B. Final Random Measurement Exam	100 points	
C. Final Exam	100 points	
D. Class Participation	55 points	

## EVALUATION GUIDELINES:

**Documented Measurements to complete:** In testing, as in many other facets of life, you gain so much wisdom by experience. Therefore, you're going to gain a lot of experience! The major part of your grade will consist of you simply completing the following measurements. You will need to keep track of your measurements in some type of journal (see below for a suggested format) – this journal can be either electronic or hard copy (submission in hard copy only).

**\*\*NOTE:** You are all adults. There is the opportunity for you to say you've done these measurements and make up all of your documentation; however, this will then be on your conscience and your performance on end of the semester, random measurement exam will suffer. Plus, if I were to find out that your journal was fabricated, I would pursue the proper procedures, including expulsion from the University and would file ethics charges with our governing professional body – ACSM. But, I think you're all adult enough that there will be no problems with this. By the way, if you know someone is fabricating his or her measurements and you don't come forward and notify me, that is considered collusion. According to the University Honor Code, collusion is as bad as the transgression itself.

1. Blood pressure: By the end of the semester, you are required to complete 500 manual blood pressure readings. These readings should be at least 40% resting (note body position) and at least 40% during exercise (the remaining 20% is up to your discretion).

2. Heart rate: By the end of the semester, you are required to complete 300 heart rate measurements. At least 10 of these 300 should come from ECGs (yes, you have to do at least 10 ECG – separate preps). Approximately 150 should come from direct palpation at rest and during exercise.

3. Stress Tests: By the end of the semester, you are required to complete at least eight stress tests and two field tests. Of these stress tests, at least three should be sub-max tests, and at least three should be on the ergometer. Each treadmill stress test should use a different protocol. We'll talk more about which protocols we'll use later (plus, you'll design your own as well). At least two of the maximal treadmill stress tests will require full ECG and metabolic gas measurements. **Important note:** You need to be a subject for at least six stress tests during the semester.

4. Body Composition: By the end of the semester, you are required to complete 17 full body composition estimates using the following technologies: two from underwater weighing, five from skinfold estimates, five using circumference measures, and five using other methods.

**Format for your measurement journal** (do a separate sheet for each measurement classification)

#	Measurement / method	Value + units	Subject (Initials)	Date	Comments
1	Blood Pressure / sphygomamometer	120/80 mm Hg	JL	1/2/09	Resting: Diastolic phase IV nonexistent/ took phase V as diastolic reading
2	Blood Pressure / sphygomamometer	135/90 mm Hg	JL	1/2/09	Stage one (3.5 mph) of TM protocol. Systolic noisy
1	Heart Rate / wrist palpitation	75 bpm	JL	1/2/09	Resting: palpation at wrist for 10 seconds
	Etc.				

**Final Random Measurement Exam** This exam will be an ‘on-the-spot’ exam where I will ask you to either perform certain measurements or will ask you questions regarding these measurements. This exam may cover one or more measurement areas and may cover the multiple methods of measurement in each area. These random measurement exams will begin to occur in April and may occur anytime you are in the laboratory, giving you plenty of time to prepare and multiple opportunities for the exam.

**Final Exam:** This exam is going to be purely mathematical where you are given several sets of measurements and required to calculate exercise prescriptions. This item will require knowledge of both exercise testing methods and prescription.

**Class Participation:** This is the type of course where you will depend on your classmates and they will depend upon you to get through the course. Thus, it is anticipated that you will participate heavily and often in class and during exercises outside of class. While I anticipate that each of you will easily earn the class participation points (which are all or none), this section of the grade allows a remedy for that student who doesn’t participate or help their classmates.



## UNIVERSITY, COLLEGE AND DEPARTMENTAL POLICIES\*

### University Policies:

#### **Code of Student Responsibility:**

“The *UNC Charlotte Code of Student Responsibility* (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code” (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address:

**<http://legal.uncc.edu/policies/ps-104.html>**

#### **Academic Integrity:**

Students have the responsibility to know and observe the requirements of The UNC Charlotte Code of Student Academic Integrity. This code forbids cheating, fabrications, or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. Academic evaluations in this course include a judgment that the student’s work is free from academic dishonesty of any type; and grades in this course therefore should be and will adversely affected by academic dishonesty. Students who violate the code can be expelled from UNC Charlotte. The normal penalty for a first offense is zero credit on the work involving dishonesty and further substantial reduction in the course grade. In almost all cases the course grade is reduced to F. Copies of the code can be obtained from the Dean of Students Office or <http://legal.uncc.edu/policies/ps-105.html>. Students are expected to report cases of academic dishonesty to the course’s instructor.

**Special Needs:** If you have a documented disability and require accommodation in this course, contact Disability Services, Fretwell 230, phone: 687 4355 voice/TDD) the first week of the semester. Information about available services may be found at <http://legal.uncc.edu/policies/ps-51.html>. Accommodations for learning will be arranged by that office and communicated to the Instructor. If you speak English as a second language, please inform the instructor.

#### **Diversity Statement:**

UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (<http://www.legal.uncc.edu/policies/ps-61.html>) and the policy on Responsible Use of University Computing and Electronic Communication Resources (<http://www.legal.uncc.edu/policies/ps-66.html>). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

#### **Religious Accommodation:**

It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a [Request for Religious Accommodation Form](#) to their instructor prior to the census date for enrollment for a given semester <http://legal.uncc.edu/policies/ps-134.html> . The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte’s Academic Calendar (<http://registrar.uncc.edu/calendars/calendar.htm>) .

## COURSE OUTLINE

<i>Week</i>	<i>Topic</i>
1	Intro / Overview / Metabolic Calcs / 'A Stress Test'
2	Blood Pressure
3	Blood Pressure
4	Heart Rate / ECG
5	Heart Rate / ECG
6	Heart Rate / ECG
7	Metabolic Testing
8	<b>Spring Break!</b>
9	Metabolic Testing
10	Metabolic Testing
11	Metabolic Testing
12	Body Composition
13	Body Composition
14	Body Composition
15	Free lab time
16	<b>Final Exam (2:00 pm)</b>

The above schedule is somewhat generic....so, here are the techniques we are going to cover over the course of the semester:

- 1) Blood Pressure: Sphygmomanometry, manual and automated. Techniques, calibration, resting, and exercise.
- 2) Heart Rate: Palpitation, ECG and telemetry, Polar HR monitors. Techniques, calibration, resting, and exercise.
- 3) Metabolic Testing: Ergometer, treadmill, some field testing (minimal), metabolic gas determination. Techniques, calibration, resting (& BMR!) and exercise.
- 4) Body Composition: Skinfolds, BIA, Underwater weighing, Near-infrared, DEXA(?). Techniques and calibration
- 5) Metabolic calculations - (Including the use of body comp and metabolic calculations to determine appropriate weight loss – etc.)

\*This schedule is tentative and subject to change. Changes will be emailed to students.\*

The University of North Carolina at Charlotte  
College of Health and Human Services  
Department of Kinesiology

\*\*\*\*\*

**Course Number:** KNES 6170  
**Course Title:** Neuromechanics of Gait & Posture  
**Credit Hours:** 3 credit hours  
**Pre and co-requisites:** Enrollment in the graduate Kinesiology program

Meeting Days & Times: TBD  
Class location: TBD

**Instructor:** TBD  
**Office Location:** TBD  
**Office Hours:** TBD  
**Telephone number:** TBD  
**E-mail address:** TBD

**Course Description:** The influence of central and peripheral mechanisms on gait and posture will be emphasized by reviewing experimental protocols that have perturbed human movement. Instruction will include both normal and pathological studies and the effect that interventions may have on disturbances in gait and posture.

**Course Objectives:** Following selected readings, and discussion that focus on the control of gait and posture, the student will be able to:

1. Understand the concept of a central pattern generator and how it may be influenced by central and peripheral input.
2. Understand the ontogeny of gait
3. Understand the normal and patient response to perturbation during gait.
4. Understand the need for reflex modulation during gait and posture.
5. Discuss sensory integration and the maintenance of upright posture.
6. Understand the normal and patient response to perturbation of upright posture.
7. Discuss the process of gait initiation and importance of limb loading to this process.
8. Discuss the interaction of voluntary movement and postural control.
9. Understand the biomechanics of transition from a stable to an unstable base of support.
10. Develop an insight into experimental protocols investigating posture and gait through laboratory experience.

**Required Text:** Research and review papers will be provided as readings throughout the semester.

**Grading Scale:**

>90%: A

80-89%: B

70-79%: C

<69%: U (Unsatisfactory)

**Evaluation Methods:**

The student's final grade is based on the cumulative number of points earned in class:

Evaluation Type	Number	Points Each	Total
Participation	1	100	100
Research Project	1	100	100
Mid-Term Exam	1	100	100
Final Exam	1	100	100
Total			400

**EVALUATION GUIDELINES:**

We will review 4-8 papers per class. Students will be assigned to present these papers. In addition, students will be assigned to either prepare questions on these papers or be prepared to answer these questions. I have provided a sample article summary that the presenters should use as a guide and provide to the class. I will also provide a computer and projector for displaying figures from the articles. Your participation in class is worth 25% of your grade.

You will develop a research topic. During the semester it will be your responsibility to do a review of literature and generate a research protocol. You will present your research topic during the last class of the semester. In addition you are to write a paper, written as a grant submission to the UNC Charlotte Faculty Research Grants Program. This paper will be distributed to the class a week before the presentation. During the semester, time will be devoted to demonstrating your data collection techniques so that the rest of the class can observe and discuss your protocol. Your research project is worth 25% of your grade.

The mid-term and final examination will consist of a variety of questions. The final examination will be comprehensive and both exams will test your ability to integrate the relevant literature. Each examination is worth 25% of your grade.

## UNIVERSITY, COLLEGE AND DEPARTMENTAL POLICIES\*

### University Policies:

#### **Code of Student Responsibility:**

“The *UNC Charlotte Code of Student Responsibility* (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code” (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address:

**<http://legal.uncc.edu/policies/ps-104.html>**

#### **Academic Integrity:**

Students have the responsibility to know and observe the requirements of The UNC Charlotte Code of Student Academic Integrity. This code forbids cheating, fabrications, or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. Academic evaluations in this course include a judgment that the student’s work is free from academic dishonesty of any type; and grades in this course therefore should be and will adversely affected by academic dishonesty. Students who violate the code can be expelled from UNC Charlotte. The normal penalty for a first offense is zero credit on the work involving dishonesty and further substantial reduction in the course grade. In almost all cases the course grade is reduced to F. Copies of the code can be obtained from the Dean of Students Office or <http://legal.uncc.edu/policies/ps-105.html>. Students are expected to report cases of academic dishonesty to the course’s instructor.

**Special Needs:** If you have a documented disability and require accommodation in this course, contact Disability Services, Fretwell 230, phone: 687 4355 voice/TDD) the first week of the semester. Information about available services may be found at <http://legal.uncc.edu/policies/ps-51.html>. Accommodations for learning will be arranged by that office and communicated to the Instructor. If you speak English as a second language, please inform the instructor.

#### **Diversity Statement:**

UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (<http://www.legal.uncc.edu/policies/ps-61.html>) and the policy on Responsible Use of University Computing and Electronic Communication Resources (<http://www.legal.uncc.edu/policies/ps-66.html>). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

#### **Religious Accommodation:**

It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a [Request for Religious Accommodation Form](#) to their instructor prior to the census date for enrollment for a given semester <http://legal.uncc.edu/policies/ps-134.html> . The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte’s Academic Calendar (<http://registrar.uncc.edu/calendars/calendar.htm>) .

## COURSE OUTLINE (with list of potential articles)

### **Week 1                      Biomechanics of Gait Initiation**

- Nissan M, Whittle MW (1990). Initiation of gait in normal subjects: A preliminary study. J Biomed Eng, 12, 165-171.
- Elble RJ et al. (1994). The initiation of normal walking. Mov Disorders, 9, 139-146.
- Mann RA et al. The initiation of gait. J Bone Joint Surg, 61-A, 1979, 232-239.

### **Week 2                      Programming of the initiation of gait**

- Brunt D et al. Invariant characteristics of gait initiation. Amer J Phys Med Rehabil, 70, 1991, 206-212.
- Crenna P, Frigo C. A motor programme for the initiation of forward oriented movements in humans. J Physiol, 437, 635-653.
- Brunt D et al. Principles underlying the organization of movement initiation from quiet stance. Gait Posture, 1999, 10, 121-128.
- Bent LR, Inglis JT, McFadyen BJ 2002. Vestibular contributions across the execution of a voluntary forward step. Exp Brain Res 143 (1): 100-105 MAR 2002

### **Week 3 & 4    Gait initiation in patient populations**

- Brunt D et al. (1996). The relation between limb loading and control parameters of gait initiation in persons with stroke. Arch Phys Med Rehab, 76, 627-634.
- Crenna P et al. (1990). The initiation of gait in Parkinson's disease. In Berardelli A, Benecke R, Manfredi M, Marsden CD (eds), Motor disturbances, vol 2, London: Academic Press, 161-173.
- Burleigh-Jacobs A et al. (1997). Step initiation in Parkinson's disease: Influence of levodopa and external sensory triggers. Movement Disorders, 12, 206-215.
  
- Michel V, Chong RKY (2004). The strategies to regulate and to modulate the propulsive forces during gait initiation in lower limb amputees. EXPERIMENTAL BRAIN RESEARCH 158 (3): 356-365
- Tokuno CD, Sanderson DJ, Inglis JT, et al. Postural and movement adaptations by individuals with a unilateral below-knee amputation during gait initiation. GAIT & POSTURE 18 (3): 158-169 DEC 2003
- Halliday SE, Winter DA, Frank JS, et al. 1998. The initiation of gait in young, elderly, and Parkinson's disease subjects. GAIT & POSTURE 8 (1): 8-14 AUG
- Hass C, Bishop M, Doidge D, Wikstrom E. Chronic ankle instability alters central organization of movement. Am J Sports Med 2010; 38(4): 829-834.

### **Week 5                      Leg raising**

- Rogers MW, Pai YC. Dynamic transitions in stance support accompanying leg flexion movements in man. Exp Brain Res, 81, 1990, 398-402.
- Rogers MW, Hedman LD, Pai YC. Kinetic analysis of dynamic transitions in stance support accompanying voluntary leg flexion movements in hemiparetic adults. Arch Phys Med Rehabil, 74, 1993, 19-25.
- Mouchnino et al. Postural reorganization of weight-shifting in below knee amputees during leg raising. Exp Brain Res 1998, 121, 205-214.
- Tonolli I, Aurenty R, Lee RG, et al. 200. Lateral leg raising in patients with Parkinson's disease: Influence of equilibrium constraint. MOVEMENT DISORDERS 15 (5): 850-861 SEP 2000

### **Week 6                      Stepping to perturbation**

- McIlroy WE and Maki BE (1993). Task constraints on foot movement and the incidence of compensatory stepping following perturbation of upright stance. Brain Res, 616, 30-38.
- McIlroy WE and Maki BE (1993). Changes in early automatic postural responses associated with the prior planning and execution of a compensatory step. Brain Res, 631, 203-211.
- McIlroy WE and Maki BE (1996). Influence of destabilization on the temporal characteristics of volitional stepping. J Mot Behav, 28, 28-34.

- Jobges M, Heuschkel G, Pretzel et al. Repetitive training of compensatory steps: a therapeutic approach for postural instability in Parkinson's disease. *J Neurol Neurosurg Psychiatry*. 2004 Dec;75(12):1682-1687.
- Hall CD, Jensen JL. Age-related differences in lower extremity power after support surface perturbations *JOURNAL OF THE AMERICAN GERIATRICS SOCIETY* 50 (11): 1782-1788 NOV 2002.
- Bateni H, Heung E, et al. Can use of walkers or canes impede lateral compensatory stepping movements? *Gait Posture*. 2004 Aug;20(1):74-83.
- Rogers MW, Johnson ME, Martinez KM, et al. Step training improves the speed of voluntary step initiation in aging. *JOURNALS OF GERONTOLOGY SERIES A-BIOLOGICAL SCIENCES AND MEDICAL SCIENCES* 58 (1): 46-51 JAN 2003

**Week 7                      Mid-Term Exam**

**Week 8 & 9                      Central Pattern Generators and the ontogeny of locomotion**

- Grillner S. Neurobiological bases of rhythmic motor acts in vertebrates. *Science*, 228,1985, 143-149.
- Forsberg H. Ontogeny of human locomotor control. 1. Infant stepping, supported locomotion and transition to independent locomotion. *Exp. Brain Res*, 57, 1985, 480-493.
- Nashner LM. Balance adjustments of humans perturbed while walking. *J Neurophysiol*, 44, 1980, 650-64.
- Duysens, J., Van de Crommert, H.W., 1998. Neural control of locomotion; the central pattern generator from cats to humans. *Gait Posture* 7, 131-141.
- Van de Crommert, H.W., Mulder, T., Duysens, J., 1998. Neural control of locomotion: Sensory control of the central pattern generator and its relation to treadmill training. *Gait Posture* 7, 251-263.
- Lamb, T., Yang, J.F., 2000. Could different directions of infant stepping be controlled by the same locomotor central pattern generator? *J Neurophysiol* 83, 2814-2824.

**Week 10                      Stepping during gait**

- Patla AE, Rietdyk S. Visual control of limb trajectory over obstacles during locomotion: effect of obstacle height and width. *Gait and Posture*, 1, 45-60, 1993.
- Patla AE et al. Locomotor patterns of the leading and the trailing limbs as solid and fragile objects are stepped over: Some insights into the role of vision during locomotion. *J Motor Behav*, 28, 35-47, 1996.
- Draganich, LF; Kuo, CE. The effects of walking speed on obstacle crossing in healthy young and healthy older adults *JOURNAL OF BIOMECHANICS*, 37 (6): 889-896 JUN 2004
- Krell, J; Patla, AE. The influence of multiple obstacles in the travel path on avoidance strategy. *GAIT & POSTURE*, 16 (1): 15-19 AUG 2002

**Week 11                      Patient stepping**

- Chen HC et al. Effects of age and available response time on ability to step over an obstacle. *J Gerontol*, 49, M227-M233, 1994.
- Hill et al. Altered kinetic strategy for the control of swing limb elevation over obstacles in unilateral below-knee amputee gait. *J biomechanics* 1999, 32, 545-549.
- Said et al. Obstacle crossing in subjects with stroke. *Arch Phys med rehabil* 1999, 80, 1054-1059.
- Hahn ME, Chou LS Age-related reduction in sagittal plane center of mass motion during obstacle crossing *JOURNAL OF BIOMECHANICS* 37 (6): 837-844 JUN 2004
- McKenzie NC, Brown LA Obstacle negotiation kinematics: age-dependent effects of postural threat *GAIT & POSTURE* 19 (3): 226-234 JUN 2004
- Berg, WP; Blasi, ER Stepping performance during obstacle clearance in women: Age differences and the association with lower extremity strength in older women. *JOURNAL OF THE AMERICAN GERIATRICS SOCIETY*, 48 (11): 1414-1423 NOV 2000

**Week 12                      Sit to stand**

- Bernardi M, Rosponi A, Castellano V, et al. Determinants of sit-to-stand capability in the motor impaired elderly. *J Electromyogr Kinesiol*. 2004 Jun;14(3):401-10.

- Janssen WG, Bussmann HB, Stam HJ. Determinants of the sit-to-stand movement: a review. *Phys Ther.* 2002 Sep;82(9):866-79.
- Inkster LM, Eng JJ. Postural control during a sit-to-stand task in individuals with mild Parkinson's disease *EXPERIMENTAL BRAIN RESEARCH* 154 (1): 33-38 JAN 2004
- Mourey F, Grishin A, d'Athis P, Pozzo T, Stapley P. Standing up from a chair as a dynamic equilibrium task: a comparison between young and elderly subjects. *J Gerontol A Biol Sci Med Sci.* 2000 Sep;55(9):B425-31.
- Alexander NB, Galecki AT, Grenier ML, et al. Task-specific resistance training to improve the ability of activities of daily living-impaired older adults to rise from a bed and from a chair. *J Am Geriatr Soc.* 2001 Nov;49(11):1418-27.
- Goulart FR, Valls-Sole J. Patterned electromyographic activity in the sit-to-stand movement. *Clin Neurophysiol.* 1999 Sep;110(9):1634-40.
- Mazza, C; Benvenuti, F; Bimbi, C; et al. Association between subject functional status, seat height, and movement strategy in sit-to-stand performance *JOURNAL OF THE AMERICAN GERIATRICS SOCIETY,* 52 (10): 1750-1754 OCT 2004
- Pai YC, Rogers MW. Segmental contributions to total body momentum in sit-to-stand. *Med Sci Sports Exerc.* 1991 Feb;23(2):225-30.
- Pai YC, Rogers MW. Control of body mass transfer as a function of speed of ascent in sit-to-stand. *Med Sci Sports Exerc.* 1990 Jun;22(3):378-84.]

### **Week 13 Postural perturbation**

- Nashner LM, Cordo PJ. Relation of automatic postural responses and reaction-time voluntary movements of human leg muscles. *Exp Brain Res,* 43, 1981, 395-405.
- Black FO, Wall C, Nashner LM. Effects of visual and support surface orientation references upon postural control in vestibular deficient subjects. *Acta Otolaryn,* 95, 1983, 199-210.
- Ting LH, Macpherson JM. A limited set of muscle synergies for force control during a postural task. *J Neurophysiol.* 2004 Sep 1;
- Dimitrova D, Nutt J, Horak FB. Abnormal force patterns for multidirectional postural responses in patients with Parkinson's disease. *Exp Brain Res.* 2004 May;156(2):183-95.
- Bateni H, Zecevic A, McIlroy WE, Maki BE. Resolving conflicts in task demands during balance recovery: does holding an object inhibit compensatory grasping? *Exp Brain Res.* 2004 Jul;157(1):49-58.

### **Week 14 Automatic postural adjustments**

- Horak FB, Esselman P, Anderson ME, Lynch MK. The effects of movement velocity, mass displaced, and task certainty on associated postural adjustments made by normal and hemiplegic individuals. *J Neurol Neurosurg Psychiatr,* 47, 1984, 1020-1028.
- Rogers MW, Kukulka CG, Soderberg GL. Postural adjustments preceding rapid arm movements in parkinsonian subjects. *Neurosci Letters,* 75, 1987, 246-251.
- Kaminski TR, Simpkins S. The effects of stance configuration and target distance on reaching. I. Movement preparation. *Exp Brain Res.* 2001 Feb;136(4):439-46.
- Slijper, H; Latash, ML The effects of muscle vibration on anticipatory postural adjustments *BRAIN RESEARCH,* 1015 (1-2): 57-72 JUL 23 2004
- Rocchi, L; Chiari, L; Horak, FB. Effect of levodopa and DBS on anticipatory postural adjustments in subjects with Parkinson's disease. *MOVEMENT DISORDERS,* 19: S187-S188 P526 Suppl. 9 2004
- Bonnetblanc, F; Martin, O; Teasdale, N. Pointing to a target from an upright standing position: anticipatory postural adjustments are modulated by the size of the target in humans *NEUROSCIENCE LETTERS,* 358 (3): 181-184 APR 1 2004

### **Week 15 Research Presentations**

### **Week 16 Final Exam**



## **Additional Readings**

- Jian Y et al. Trajectory of the body COG and COP during initiation and termination of gait. Gait and Posture, 1, 9-22, 1993.
- Michel V, Do MC 2002. Are stance ankle plantar flexor muscles necessary to generate propulsive force during human gait initiation? NEUROSCIENCE LETTERS 325 (2): 139-143
- Friedli WG, Hallett M, Simon SR. Postural adjustments associated with rapid voluntary arm movements 1. Electromyographic data. J Neurol Neurosurg Psychiatr, 47, 1984, 611-622.
- Friedli WG, Cohen L, Hallett M, Simon SR. Postural adjustments associated with rapid voluntary arm movements. 11. Biomechanical analysis. J Neurol Neurosurg Psychiatr, 51, 1988, 232-243.
- Diener HC, Dichgans J, Guschlbauer B, Bacher M, Langenbach P. Disturbances of motor preparation in basal ganglia and cerebellar disorders. In Allum JHJ Hulliger M (Eds) Progress in Brain Research, Vol 80, Elsevier Science Pub, 1989.
- Burleigh et al. Modification of postural responses and step initiation: Evidence for goal directed postural interactions. J Neurophysiol, 72, 2892-2902, 1994.
- Schenkman M et al. Whole-body movements during rising to standing from sitting. Physical Therapy, 70, 1990, 638-651.
- Pai Y, Rogers MW. Control of body mass transfer as a function of speed of ascent in sit-to-stand. Med Sci Sports Exer, 22, 1990, 378-384.
- Millington PJ et al. Biomechanical analysis of the sit-to-stand motion in elderly persons. Arch Phys Med Rehabil, 73, 1992, 609-617
- Alexander NB, Schultz AB, Warwick DN. Rising from a chair: Effects of age and functional ability on performance biomechanics. J Gerontol, 46, 1991, 91-98.
- Vander Linden DW, Brunt D, McCulloch M. Variant and invariant characteristics of the sit-to-stand task in healthy elderly adults. Arch Phys Med Rehab, 75:653-659, 1994.
- Forsberg H, Nashner LM. Ontogenetic development of postural control in man: Adaptation to altered support and visual conditions during stance. J Neurosci, 2, 1982, 545-552.
- Manchester D et al. Visual, vestibular and somatosensory contributions to balance control in the older adult. J Gerontol, 44, 1989, 118-127.
- Badke MB, Di Fabio RP. Effects of postural bias during support surface displacements and rapid arm movements. Physical Therapy, 65, 1490-1495.
- Brunt D et al. Postural responses to lateral perturbation in healthy subjects and ankle sprain patients. Med Sci Sports Exer, 24, 1992, 171-176.
- Garcia-Rill E. The basal ganglia and the locomotor regions. Brain Res Reviews, 11, 1986, 47-63.
- Armstrong DM. The supraspinal control of mammalian locomotion. J Physiol, 405, 1-37.

- Grillner S., Zangger P. The effect of dorsal root transection on the efferent motor pattern in the cat's hindlimb during locomotion. Acta Physiol Scand, 120, 393-405, 1984.
- Dietz V, Colombo G, Jenson L. (1994) Locomotor activity in spinal man. Science, 344,1260-1263.
- Wernig A, Miller S. (1992) Laufband locomotion with body weight support improved walking in persons with severe spinal cord injuries. Paraplegia, 30, 229-238.
- Berger W, Altenmueller E, Dietz V. Normal and impaired development of children's gait. Human Neurobiol, 3, 1984, 163-170.
- Myklebust BM et al. Reciprocal excitation of antagonistic muscles as a differentiating feature in spasticity. Annals Neurol, 12, 367-374, 1982.
- Berger W, Dietz V, Quintern J. Corrective reactions to stumbling in man: Neuronal co-ordination of bilateral leg muscle activity during gait. J Physiol, 357, 1984, 109-125.
- Brunt D, William's J, Rice RR. Analysis of EMG activity and temporal components of gait during recovery from perturbation. Arch Phys Med Rehabil, 71, 1990, 473-477.
- Dietz V, Quintern J, Berger W. Afferent control of human stance and gait: Evidence for blocking of group I afferents during gait. Exp Brain Res, 61, 1985, 153-163.
- Berger W, Quintern J, Dietz V. Stance and gait perturbations in children: Developmental aspects of compensatory mechanisms. Electroenceph Clin Neurophysiol, 61, 1985, 385-395.
- Capaday C, Stein RB. Amplitude modulation of the soleus H-reflex in the human during walking and standing. J Neurosci, 6, 1308-1313, 1986.
- Capaday C, Stein RB. Difference in the amplitude of the human soleus H reflex during walking and running. J Physiol, 392, 513-522, 1987.
- Llewellyn M et al. Human H-reflexes are smaller in difficult beam walking than in normal treadmill walking. Exp Brain Res, 83, 22-28, 1990.
- Edamura M et al. Factors that determine the magnitude and time course of human H-reflexes in locomotion. J Neurosci, 11, 420-427, 1991.
- Dietz V. Role of peripheral afferents and spinal reflexes in normal and impaired human locomotion. Rev Neurol (Paris), 143, 241-254, 1987.
- Simoneau GG et al. The influence of visual factors on fall-related kinematic variables during stair descent by older women. J Gerontol, 46, M188-M195, 1991.
- Knutsson E, Richards C. Different types of disturbed motor control in gait of hemiparetic patients. Brain, 102, 1979, 405-430.
- Hanke TA, Pai YC, Rogers MW. Reliability of measurements of body center-of-mass momentum during sit-to-stand in healthy adults. Phys Ther. 1995 Feb;75(2):105-13; discussion 113-8.
- Pai YC, Rogers MW. Speed variation and resultant joint torques during sit-to-stand. Arch Phys Med Rehabil. 1991 Oct;72(11):881-5.

## Student Learning Outcomes Assessment Plan and Report Template

(Document student learning outcomes assessment plans and data for each undergraduate and graduate degree program offered by the college)

**College:** Health & Human Services

**Department:** Kinesiology

**Academic Program:** MS- Kinesiology: Clinical Exercise Physiology Concentration

### Student Learning Outcome 1 (knowledge, skill or ability assessed)

The graduate will demonstrate the knowledge and skills on the effects of exercise training (aerobic, resistance and flexibility) on physiological systems in populations.

### Effectiveness Measure

The direct instruments used to gauge acquisition of the SLO are the midterm and final examination taken for selected courses that address the SLO #1. The following courses capture the KSAs for SLO #1: KNES 6280 Advanced Clinical Exercise Physiology, KNES 6134 Cardiopulmonary and Metabolic diseases Exercise Prescription and KNES 6120 Advances in Clinical Exercise Physiology.

The indirect measurement used to gauge acquisition of the SLO is the graduate exit survey (see attached document) that the students take during the semester they graduate (question #19): “Did the program prepare you in the knowledge, skills and attributes as relates to basic physiology or healthy and aging populations as well as the effects of aerobic, resistance and flexibility training on cardiovascular, respiratory, musculoskeletal, neuromuscular, metabolic, endocrine, and immune systems required of the graduate clinical exercise physiologist”.

### Methodology

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for these courses (KNES 6280, KNES 6134, KNES 6120). KNES 6280 and KNES 6134 are offered during the Spring semester and KNES 6120 is offered in the Fall semester. The assessment data was collected by the program coordinator from faculty for both exams at the end of each term the course was taught.

For the indirect measurement, the percentage of graduate students who scored 3 or higher on the graduate exit survey question #19: “Did the program prepare you in the knowledge, skills and attributes as relates to basic physiology or healthy and aging populations as well as the effects of aerobic, resistance and flexibility training on cardiovascular, respiratory, musculoskeletal, neuromuscular, metabolic, endocrine, and immune systems required of the graduate clinical exercise physiologist” was quantified. The exit survey was administered by whom? at the end of the Spring semester for graduating students and required to be completed as part of the 3<sup>rd</sup> Practicum course (KNES 6490).

The results from the direct and indirect measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for changes to the course(s) and / or curriculum and the Program Coordinator disseminates the results to the Program Faculty and Department Chair for endorsement and final approval. The course instructor implements changes in their course if needed.

**Performance Outcome**

The Performance Outcome for the direct measure is defined as: 80% or higher receive a grade of 80% or higher on the midterm and final exam.

The Performance Outcome for the indirect measurement is defined as: 80% or higher agree or strongly agree with question #19: “Did the program prepare you in the knowledge, skills and attributes as relates to basic physiology or healthy and aging populations as well as the effects of aerobic, resistance and flexibility training on cardiovascular, respiratory, musculoskeletal, neuromuscular, metabolic, endocrine, and immune systems required of the graduate clinical exercise physiologist”.

**2011-12 Assessment Data**

For the direct measurement =

KNES 6280: the course is taught Spring, 2012.

KNES 6134: the course is taught Spring 2012.

KNES 6120: (N=12): 92% of students received a grade of 80% or higher on questions # 1,5,7,11,16,29,32 & short answers 2& 5 for the midterm exam. For the final exam, 100% of students received a grade of 80% or higher on question #s 15,17,19,24,27,& short answer #3.

For the indirect measurement: The survey is administered in Spring, 2012.

**Changes/improvements that were made on the basis of assessment data:**

The changes/improvements will be determined following obtaining data from the Spring 2012 courses.

**Student Learning Outcome 2 (knowledge, skill or ability assessed)**

The graduate will be prepared in the knowledge and skills related to pathophysiology of human diseases of (cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases).

**Effectiveness Measure**

The direct instruments used to gauge acquisition of the SLO are the midterm and final examination taken for selected courses that address the SLO #2. The following courses capture the KSAs for SLO #2: KNES 6134 Exercise Prescription for Cardiopulmonary and Metabolic Diseases, KNES 6292 Exercise Prescription for Musculoskeletal Disorders, and KNES 6285 Advanced Cardiopulmonary Physiology.

The indirect measurement used to gauge acquisition of the SLO is the graduate exit survey that the students take during the semester they graduate (question #20): “Did the program prepare you in the knowledge, skills and attributes as relates to the pathophysiology and risk factors of cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist.”

**Methodology**

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for these courses (KNES 6134, KNES 6292, and KNES 6285). The assessment data was collected by the program coordinator for both exams at the end of each term the course was taught.

For the indirect measurement, the percentage of graduate students who scored 3 or higher on the graduate exit survey question #20: “Did the program prepare you in the knowledge, skills and attributes as relates to the pathophysiology and risk factors of cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist.” was quantified. The exit survey was administered by whom? at the end of the Spring semester for graduating students and required to be completed as part of the 3<sup>rd</sup> Practicum course (KNES 6490).

The results from the direct and indirect measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for changes to the course(s) and / or curriculum and disseminates to Program Faculty and Department Chair for final approval.

**Performance Outcome**

The Performance Outcome for the direct measure is defined as: Completion of midterm and final exam with a grade of B or higher. The benchmark goal was 80% or higher receive a grade of B or higher on the midterm and final exam. A grade of B or higher is a score of 80% or more on an exam.

The Performance Outcome for the indirect measurement is defined as: 80% or higher agree or strongly agree on question #20: “Did the program prepare you in the knowledge, skills and attributes as relates to the pathophysiology and risk factors of cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist.”

**2011-12 Assessment Data**

For the direct measurement =

KNES 6134: The course is taught Spring, 2012.

KNES 6292: The course is taught Summer, 2012.

KNES 6285: The course is taught, Spring 2012.

For the indirect measurement: The survey is administered in Spring, 2012.

**Changes/improvements that were made on the basis of assessment data:**

The changes/improvements will be determined following obtaining data from the Spring 2012 and Summer 2012 courses.

**Student Learning Outcome 3 (knowledge, skill or ability assessed)**

The graduate will be prepared in the knowledge and skills related to medical management of human diseases (cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic).

**Effectiveness Measure**

The direct instrument used to gauge acquisition of the SLO is the midterm and final examination taken for selected courses that address the SLO #3. The following courses capture the KSAs for SLO #3: KNES 6134 Exercise Prescription for Cardiopulmonary and Metabolic Diseases, KNES 6292 Exercise

Prescription for Musculoskeletal Disorders and KNES 6120 Advances in Clinical Exercise Physiology.

The indirect measurement used to gauge acquisition of the SLO is the graduate exit survey that the students take during the semester they graduate (question #21): “Did the program prepare you in the knowledge, skills and attributes as relates to medical and surgical management of cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist”.

**Methodology**

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for these courses (KNES 6134, KNES 6292 and KNES 6120). The assessment data was collected by the program coordinator for both exams at the end of each term the course was taught. The results were then shared with the chair of the department for approval to disseminate to the faculty.

For the indirect measurement, the percentage of graduate students who scored 3 or higher on the graduate exit survey question #21: “Did the program prepare you in the knowledge, skills and attributes as relates to medical and surgical management of cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist” was quantified. The exit survey was administered at the end of the Spring semester for graduating students and required to be completed as part of the 3<sup>rd</sup> Practicum course (KNES 6490). The results were then shared with the chair of the department for approval to disseminate to the faculty.

The outcomes from the direct and indirect measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for the course(s) and / or curriculum and disseminates to Program Faculty and Department Chair for final approval.

**Performance Outcome** (the percentage of students assessed that need to demonstrate competency in the student learning outcome to satisfy the expectations of the department faculty) *Example: 80% of the students assessed will achieve a score of 3 or better (on a 5 point scale) on their oral presentation.*

The Performance Outcome for the direct measure is defined as: Completion of midterm and final exam with a grade of B or higher. The benchmark goal was 80% or higher receive a grade of B or higher on the midterm and final exam. A grade of B or higher is a score of 80% or more on an exam.

The Performance Outcome for the indirect measurement is defined as: 80% or higher agree or strongly agree on question #21: “Did the program prepare you in the knowledge, skills and attributes as relates to medical and surgical management of cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist”.

**2011-12 Assessment Data** (Results can be shown by year or by semester)

For the direct measurement = KNES 6134: This course is taught in Spring, 2012. For KNES 6292: This course is taught in Summer, 2012.  
KNES 6120: (N=12): 58% of students received a grade of 80% or higher on questions # 2,30 & short answers #1 and 6% for the midterm exam. For the final exam, 92% of students received a grade of 80% or higher on question # 23.

For the indirect measurement: The survey is administered in Spring, 2012.

**Changes/improvements that were made on the basis of assessment data:**

The changes/improvements will be determined following obtaining data from the Spring 2012 and Summer 2012 courses.

**Student Learning Outcome 4 (knowledge, skill or ability assessed)**

The graduate will be competent in the knowledge and skills related to clinical exercise testing.

**Effectiveness Measure (the instrument, project, presentation, etc. that was used to gauge acquisition of the student learning outcome)**

The direct instrument used to gauge acquisition of the SLO is the midterm and final examination taken for selected courses that address the SLO #4. The following courses capture the KSAs for SLO #4: KNES 6134 Exercise Prescription for Cardiopulmonary and Metabolic Diseases and KNES 6151.

The indirect measurement used to gauge acquisition of the SLO is the graduate exit survey that the students take during the semester they graduate (question #22): “Did the program prepare you in the knowledge, skills and attributes as relates to health appraisal, fitness and clinical exercise testing required of the graduate clinical exercise physiologist”.

**Methodology (the method that was used to administer the assessment and collect, analyze and disseminate the assessment data)**

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for this courses (KNES 6134 and KNES 6151). The assessment data was collected by the program coordinator for both exams at the end of each term the course was taught. The results were then shared with the chair of the department for approval to disseminate to the faculty.

For the indirect measurement, the percentage of graduate students who scored 3 or higher on the graduate exit survey question #22: “Did the program prepare you in the knowledge, skills and attributes as relates to health appraisal, fitness and clinical exercise testing required of the graduate clinical exercise physiologist” was quantified. The exit survey was administered at the end of the Spring semester for graduating students and required to be completed as part of the 3<sup>rd</sup> Practicum course (KNES 6490). The results were then shared with the chair of the department for approval to disseminate to the faculty.

The outcomes from the direct and indirect measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for the course(s) and / or curriculum and disseminates to Program Faculty and Department Chair for endorsement and final approval.

**Performance Outcome (the percentage of students assessed that need to demonstrate competency in the student learning outcome to satisfy the expectations of the department faculty) *Example: 80% of the students assessed will achieve a score of 3 or better (on a 5 point scale) on their oral presentation.***

The Performance Outcome for the direct measure is defined as: Completion of midterm and final exam with a grade of B or higher. The benchmark goal was 80% or higher receive a grade of B or higher on the midterm and final exam. A grade of B or higher is a score of 80% or more on an exam.

The Performance Outcome for the indirect measurement is defined as: 80% or higher agree or strongly agree on question #22 : “Did the program prepare you in the knowledge, skills and attributes as relates to health appraisal, fitness and clinical exercise testing required of the graduate clinical exercise physiologist”.

**2011-12 Assessment Data** (Results can be shown by year or by semester)

For the direct measurement = KNES 6134: This course is taught in Spring, 2012.  
KNES 6151: This course is taught in Spring, 2012.

For the indirect measurement: The survey is administered in Spring, 2012.

**Changes/improvements that were made on the basis of assessment data:**

The changes/improvements will be determined following obtaining data from the Spring 2012 and Summer 2012 courses.

**Student Learning Outcome 5** (knowledge, skill or ability assessed)

The graduate will be prepared in the knowledge and skills related to exercise prescription of diseased patients (cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases).

**Effectiveness Measure** (the instrument, project, presentation, etc. that was used to gauge acquisition of the student learning outcome)

The direct instrument used to gauge acquisition of the SLO is the midterm and final examination taken for selected courses that address the SLO #5. The following courses capture the KSAs for SLO #5: KNES 6134 Exercise Prescription for Cardiopulmonary and Metabolic Diseases and KNES 6292 Exercise Prescription for Musculoskeletal Disorders.

The indirect measurement used to gauge acquisition of the SLO is the graduate exit survey that the students take during the semester they graduate (question #23): “Did the program prepare you in the knowledge, skills and attributes as relates to exercise prescription and programming of healthy and aged populations as well as cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist”.



**Methodology** (the method that was used to administer the assessment and collect, analyze and disseminate the assessment data)

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for this courses (KNES 6134 and KNES 6292). The assessment data was collected by the program coordinator for both exams at the end of each term the course was taught. The results were then shared with the chair of the department for approval to disseminate to the faculty.

For the indirect measurement, the percentage of graduate students who scored 3 or higher on the graduate exit survey question #23: “Did the program prepare you in the knowledge, skills and attributes as relates to exercise prescription and programming of healthy and aged populations as well as cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist” was quantified. The exit survey was administered at the end of the Spring semester for graduating students and required to be completed as part of the 3<sup>rd</sup> Practicum course (KNES 6490). The results were then shared with the chair of the department for approval to disseminate to the faculty.

The outcomes from the direct and indirect measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for the course(s) and / or curriculum and disseminates to Program Faculty and Department Chair for final approval.

**Performance Outcome** (the percentage of students assessed that need to demonstrate competency in the student learning outcome to satisfy the expectations of the department faculty) *Example: 80% of the students assessed will achieve a score of 3 or better (on a 5 point scale) on their oral presentation.*

The Performance Outcome for the direct measure is defined as: Completion of midterm and final exam with a grade of B or higher. The benchmark goal was 80% or higher receive a grade of B or higher on the midterm and final exam. A grade of B or higher is a score of 80% or more on an exam.

The Performance Outcome for the indirect measurement is defined as: 80% or higher agree or strongly agree on question #23: “Did the program prepare you in the knowledge, skills and attributes as relates to exercise prescription and programming of healthy and aged populations as well as cardiovascular, pulmonary, metabolic, orthopedic/musculoskeletal, neuromuscular, neoplastic, immunologic and hematologic diseases required of the graduate clinical exercise physiologist”.

**2011-12 Assessment Data** (Results can be shown by year or by semester)

For the direct measurement = KNES 6134: This course is taught in Spring, 2012. For KNES 6292: This course is taught in Summer, 2012.

For the indirect measurement: The survey is administered in Spring, 2012.

**Changes/improvements that were made on the basis of assessment data:**

The changes/improvements will be determined following obtaining data from the Spring 2012 and Summer 2012 courses.

**Academic Program:** MS- Kinesiology: Applied Physiology and Neuromechanics Concentration

**Student Learning Outcome 1 (knowledge, skill or ability assessed)**

The graduate will demonstrate the knowledge and skills needed to determine the appropriate statistical method for a research question.

**Effectiveness Measure**

The direct instruments used to gauge acquisition of the SLO are the midterm and final examination taken from selected courses that address the SLO #1. The following courses capture SLO #1: KNES 6115 Research Methods in Kinesiology and KNES 6900: Thesis.

**Methodology**

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for the course in question (KNES 6115). KNES 6115 is offered during the Fall semester. Since there is no mid-term exam for KNES 6900 (Thesis), the final examination (i.e. thesis defense) during the final semester of KNES 6900 will be used to capture the graduate's competence in SLO#1. The assessment data will be collected by the program coordinator from the faculty member for both exams at the end of each term the course was taught.

The results from the direct measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for changes to the course(s) and / or curriculum and the Program Coordinator disseminates the results to the Program Faculty and Department Chair for endorsement and final approval. The course instructor implements changes in their course if needed.

**Performance Outcome**

The Performance Outcome for the KNES 6115 direct measure is defined as: 80% or higher receive a grade of 80% or higher on the midterm and final exam. In other words, 80% of the students should receive a B or better on both the mid-term and final examination. The Performance Outcome for the KNES 6900 direct measure is defined as 80% or more students pass their thesis defense on their first attempt.

**2011-2012 Assessment Data:**

NA as this is new concentration.

**Changes/improvements that were made on the basis of assessment data:**

NA as this is new concentration.

**Student Learning Outcome 2 (knowledge, skill or ability assessed)**

The graduate will be prepared in the knowledge and skills related to the effects of aging and exercise on physiological parameters.

**Effectiveness Measure**

The direct instruments used to gauge acquisition of the SLO are the midterm and final examination taken from selected courses that address the SLO #2. The following courses capture SLO #2: KNES 6280 (Advanced Exercise Physiology), KNES 6285 (Advanced Cardiopulmonary Physiology), and KNES 6232 (Physiology of Human Aging).

**Methodology**

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for the courses in question (KNES 6280, KNES 6285, KNES 6232). KNES 6232 is offered during the Fall semester while KNES 6280 and 6285 are offered during the spring semester. The assessment data will be collected by the program coordinator from the faculty member for both exams at the end of each term the course was taught.

The results from the direct measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for changes to the course(s) and / or curriculum and the Program Coordinator disseminates the results to the Program Faculty and Department Chair for endorsement and final approval. The course instructor implements changes in their course if needed.

**Performance Outcome**

The Performance Outcome for the direct measure is defined as: 80% or higher receive a grade of 80% or higher on the midterm and final exam. In other words, 80% of the students should receive a B or better on both the mid-term and final examination.

**2011-2012 Assessment Data:**

NA as this is new concentration.

**Changes/improvements that were made on the basis of assessment data:**

NA as this is new concentration.

**Student Learning Outcome 3 (knowledge, skill or ability assessed)**

The graduate will be prepared in the knowledge and skills related to the Neuromechanics of gait and posture.

**Effectiveness Measure (the instrument, project, presentation, etc. that was used to gauge acquisition of the student learning outcome)**

The direct instruments used to gauge acquisition of the SLO are the midterm and final examination taken from selected courses that address the SLO #3. The following courses capture SLO #3: KNES 6170 Neuromechanics of Gait & Posture.

**Methodology**

For the direct instrument, the midterm exam is defined as the exam administered by the instructor midway through the semester and the final exam was defined as the last exam administered by the instructor for the course in question (KNES 6170). KNES 6170 is offered during the Fall semester. The assessment data will be collected by the program coordinator from the faculty member for both exams at the end of each term the course was taught.

The results from the direct measures are shared with the Program Coordinator, Program Faculty, and Department Chair. The Program Coordinator develops a plan for changes to the course(s) and / or curriculum and the Program Coordinator disseminates the results to the Program Faculty and Department Chair for endorsement and final approval. The course instructor implements changes in their course if needed.

**Performance Outcome (the percentage of students assessed that need to demonstrate competency in the student learning outcome to satisfy the expectations of the department faculty) *Example: 80% of the students assessed will achieve a score of 3 or better (on a 5 point scale) on their oral presentation.***

The Performance Outcome for the direct measure is defined as: 80% or higher receive a grade of 80% or higher on the midterm and final exam. In other words, 80% of the students should receive a B or better on both the mid-term and final examination.

**2011-2012 Assessment Data:**

NA as this is new concentration.

**Changes/improvements that were made on the basis of assessment data:**

NA as this is new concentration.