

The Center for Teaching and Learning (CTL) and the Office of Undergraduate Research
and Experiential Learning (UREL) Instructional Improvement Grant

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Proposed Course: KAAP 285 – Introduction to Research in Health Sciences

Department: Kinesiology and Applied Physiology

Faculty:

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Dr. Chris Modlesky (Associate Professor)

Proposed Course: **KAAP 285 – Introduction to Research in Health Sciences.**

This is a new course proposal, open to undergraduate students across campus with a research interest in the Health Sciences. Students may come from departments within the College of Health Sciences (KAAP, BHAN, Nursing, Med Tech) as well as any department outside the college (e.g., Biology, Neuroscience, Engineering, Disability Studies), among others. Undergraduate students interested in the Health Sciences have limited formal research exposure, and few ways in which to learn about different types of research within the field prior to their junior/senior year. The proposed course will be a tremendous benefit to students because they will gain substantial research experience at an early point in their career. This will provide them with the general research knowledge that will enable them to participate in different research laboratories at UD focused on human health, which in turn, will lead to greater research experiences. It will also provide to a much stronger foundation for research in graduate school. The course will also benefit faculty as they will have undergraduate students who enter their lab with a much better research foundation which will aid in the mentoring process and result in more knowledgeable, productive undergraduate research assistants.

The Department of Kinesiology and Applied Physiology is well positioned to develop and offer such a course because: a) we have the 4th largest undergraduate program at the University; b) many of our faculty sponsor undergraduate research assistants through research independent studies, the Undergraduate Summer Scholars Program and the Undergraduate Summer Fellowship Program; c) we have substantially increased our research activity and peer reviewed publications during the past 10 years; and d) our department's extramural funding has included receipt of three AREA grants (R15) from the National Institutes of Health (NIH) during the past eight years, of which a major focus of these grants is the active participation of undergraduate students in the research project.

Focus of Student Learning goal: Students will understand how new knowledge is generated and disseminated through scholarship, and the importance of scholarship to society.

Credits: 3

Discovery Learning Experience? Yes

Course Description: In this course, students will learn about the basic elements of research within the general fields of Health Sciences, specifically those fields represented within the Department of Kinesiology and Applied Physiology, which may include athletic training, biomechanics, cardiovascular, computational, vascular, and musculoskeletal physiology, motor control, and neuroscience. During the first portion of the class, students will be introduced to experimental design and basic statistics. This foundational information will serve to demonstrate how researchers design appropriate experiments within a research area. The content will supplement that of STAT 200 to be field specific. During the second portion of the class, students will also undergo human subjects training by the Institutional Review Board and biosafety training by the Department of Environmental Health and Safety. The training will educate them on the safety issues related to working with human subjects and will enable them to efficiently

transition into a research laboratory. The third portion of the class will focus on learning about instrumentation and research procedures within the different laboratories, where students will learn data collection and analysis techniques used by specific researchers. In order to provide this information in a consistent manner that does not interrupt concurrent research in each laboratory, a Sakai website will be used to deliver short video clips of specific techniques used within each laboratory. This approach is currently used in Dr. Modlesky's Musculoskeletal Physiology Laboratory to train undergraduate and graduate students to conduct laboratory procedures. His videos will be used as models for the development of training videos for other procedures used in KAAP. Some examples of video shorts will be video motion analysis, electromyography, bone mineral density scanning, accelerometry, cardiovascular testing, using the BODPOD to calculate percent body fat, and reaction time analysis, among others. These clips will be followed up with hands-on testing sessions, where students can demonstrate their understanding and knowledge on the particular technique. In addition, researchers will be available at specific times to answer questions via chat. Students will develop a blog where they reflect on the different types of information they have learned; through this reflection, they can begin to narrow their preferences for different types of research techniques. After taking this course, students will be able to more effectively choose research opportunities that fit their interests, more easily integrate into the research teams that exist within each laboratory section, and better position themselves for future undergraduate research opportunities. The last portion of the class will focus on learning general skills needed to review the research literature. This will include the use of appropriate search engines to identify research articles on a particular health-related topic, such as PubMed Central, the U.S. National Institutes of Health digital archive for health-related research. It will also include a review of procedures to summarize a research article and to convey its results and potential importance to the scientific literature. Students will be asked to review a research article, summarize it and then present it to the class.

This class will be offered to students in their second or third semester at the University of Delaware. The purpose of this course is to: a) provide students with basic research skills for a broad range of fields within the Health Sciences; b) teach basic measurement/procedural techniques in several different laboratories within the KAAP Department and; c) prepare students for future opportunities to perform research within KAAP and other departments across the University of Delaware that have a research focus on human health, such as taking research credits, becoming an undergraduate research scholar, or preparing a senior thesis. This course will be taught every semester, starting in Spring 2013.

A prerequisite will not be required for the initial course offering. However, if it is found that a prerequisite, such as our one credit FYE (KAAP 105 Freshman Seminar in Exercise Science), would provide a better foundation for students entering the proposed course, we will make the prerequisite available to all majors at the University of Delaware.

Expected Enrollment per semester: 25-40

General Education Goals fulfilled:

- *Learn to think critically to solve problems.* Students will be introduced to current research issues within the field, and then learn about the field specific research designs, instrumentation, procedures, and techniques that Health Science researchers use to solve them.
- *Be able to work and learn both independently and collaboratively.* Students will learn specific data collection techniques that will allow them to become an integral part of a research team within the KAAP faculty.
- *Engage questions of ethics and recognize responsibilities to self, community, and society at large.* Much of the research performed within Health Sciences at the University of Delaware has a direct impact on the health and well being of individuals within society. In addition, much of the research involves human subjects. Students will become familiar with the underlying reasons that researchers undertake particular experiments (i.e. to improve cardiovascular health; to aid individuals with disabilities in performing activities of daily living). Also, all students will go through human subjects and biosafety training as a part of this course.

Alignment with University Strategic Initiatives: This course aligns with the following SI: A Diverse and Stimulating Undergraduate Academic Environment (expanding enrichment activities that complement students' academic experiences). This course will provide students with practical information that will enhance their ability to become engaged in research at UD, and also help them think critically about the empirical underpinnings of each type of research.

Sustainability beyond grant period: One of the advantages of this proposed course is that the majority of cost is incurred in the creation of the course, and it will not require additional funding beyond that of a typical course after it is created. A Sakai site will be developed as part of the course, and that will allow for the course to be taught each semester by more than one faculty member, without special equipment or accommodations. In addition, Dr. Bill Farquhar, the KAAP Department chair, has agreed to run this course each semester after its initiation, as KAAP is dedicated to developing excellent undergraduate experiences for students that will position the students to more successfully enter health related academics and/or careers.

Time line:

June 2012 – Each laboratory will develop on or several scripts for key instrumentation/ procedures through discussions with PIs. PIs and graduate students will assist in making the scripts undergraduate friendly. Course outline is developed (PIs).

July - August 2012 – production of video clips will begin (PIs and students). All filming will occur during this time period. Undergraduate and graduate students will develop course site on Sakai, focusing on folders for each laboratory.

September 2012 – Course outline is finalized, and course proposal goes to curriculum committee and faculty senate.

September – December 2012. PIs will work on editing video clips and adding to Sakai site. Video clips will be field tested on small groups of students enrolled in different KAAP research courses.

February 2013 – KAAP 285 will be taught by one or both of the PIs.